

وزارة الصناعة والمعادن  
هيئة البحث والتطوير الصناعي

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المؤتمر الدولي الرابع للنانوتكنولوجي وتطبيقاته  
٢٠٢٤ (١٩-٢٠) شباط

The 4<sup>th</sup> International Conference on Nanotechnology and its Applications  
(ICNA)



(منهاج و خلاصات بحوث المؤتمر)

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## أهداف المؤتمر:

١. تسليط الضوء على الابتكارات الرائدة والمستقبلية في عالم تكنولوجيا النانو وأهميتها في تناول وتقديم الحلول في مختلف المجالات، وأن يكون ملتقى للخبراء والأكاديميين والباحثين والعلماء ورواد الأعمال من مختلف البلدان وتلقى نخبة من العلماء من مختلف الجامعات والمراكز البحثية المحلية والعالمية ومشاركة ومناقشة نتائج البحوث، لتبادل الأفكار والرؤى، والتواصل من أجل التعاون والتطوير العلمي.
٢. التوعية بأهمية علم النانو تكنولوجي في مختلف التطبيقات والمجالات، نحو تحقيق أهداف التنمية المستدامة، وتعظيم دور تكنولوجيا النانو في العديد من الجوانب وتوظيفاتها الواعدة في ميادين مثل البيئة، الطب والصيدلة، الهندسة، الطاقة، الإلكترونيات، والصناعات الكيماوية وسيتيح المؤتمر للمشاركين فهم الفرص الاستثمارية والتحديات التي تحدثها هذه التكنولوجيا .
٣. إلقاء الضوء على أهم المُستحدثات في تطبيقات علم النانو تكنولوجي ودراسة أهم الاحتياجات والمعوقات التي تواجه علم النانو وإيجاد حلول لها.
٤. تعظيم دور النانوتكنولوجي في إيجاد وتطوير مصادر بديلة ونظيفة للطاقة صديقة للبيئة وإيجاد حلول بديلة للتدوير والتخلص من المخلفات البيئية ومعالجة المياه والتربة.

## محاور المؤتمر:

- ❖ التطبيقات الهندسية للنانوتكنولوجي: (هندسة الميكانيك، هندسة الميكاترونك، هندسة المواد والمعادن، الهندسة الكيماوية، هندسة البناء والانشاءات، الاسمنت ومشتقاته، الهندسة الكهربائية، الاتصالات، الامتمة).
- ❖ العلوم التطبيقية النانوية (علوم الحياة والتقنيات الاحيائية، الكيمياء التطبيقية، الفيزياء التطبيقية، الصناعات الغذائية).
- ❖ البيئة ومعالجة المخلفات الصناعية وتلوث المياه.
- ❖ الطب البشري والبيطري.
- ❖ التطبيقات الدوائية.
- ❖ التكنولوجيا الخضراء.

## اللجنة التحضيرية :

الاسم	جهة الانتساب	الصفة
عبد الرزاق داود جاسم	مدير عام هيئة البحث والتطوير الصناعي	رئيسا
رياض محمد نعمان	هيئة البحث والتطوير الصناعي/ مدير مركز البحوث الكيمياوية والبتروكيمياوية	عضوا
د. احمد انور علوان	هيئة البحث والتطوير الصناعي/ مدير قسم التنسيق البحثي والعلمي	عضوا
د.هاشم محمد زهراو	هيئة البحث والتطوير الصناعي/ مدير قسم الشؤون العلمية	عضوا
د. عبد الله عدنان	هيئة البحث والتطوير الصناعي/ مدير المركز الوطني للتعينة والتغليف	عضوا
د. محمد جابر ياس	هيئة البحث والتطوير الصناعي/ مدير مركز الطراز للبحوث النسيجية والجلدية	عضوا
د. انتصار جواد كاظم	هيئة البحث والتطوير الصناعي/ مديرة مركز ابحاث ابن سينا	عضوا
د. صادق كاظم تعبان	هيئة البحث والتطوير الصناعي	عضوا
د. حسين علي حسين	جامعة لورنس/ الولايات المتحدة	عضوا
د. حميد جاسم محمد	كلية شيردان/ كندا	عضوا
د. ليث الجبوري	جامعة اسيكس/ بريطانيا	عضوا
د. علاء كريم محمد	كلية الهندسة الخوارزمي/ جامعة بغداد	عضوا
د. رائد عبد الوهاب اسماعيل	قسم العلوم التطبيقية/ الجامعة التكنولوجية	عضوا
د. رنا عفيف مجيد	مركز بحوث النانوتكنولوجيا/ الجامعة التكنولوجية	عضوا

## اللجنة العلمية:

الاسم	جهة الانتساب	الصفة
د. احمد صالح محمد	جامعة السليمانية/ كردستان	رئيسا
د. عمر عبد الستار عبد الرزاق	هيئة البحث والتطوير الصناعي	عضوا
د. الهام خلف عبد الهادي	هيئة البحث والتطوير الصناعي	عضوا
د. هند حميد خضير	هيئة البحث والتطوير الصناعي	عضوا
د. مها جلال هاشم	جامعة نوتنغهام/ المملكة المتحدة	عضوا
د. محمد كامل محمد	جامعة الشارقة/ الامارات العربية المتحدة	عضوا
د. عبد السلام كردي المحمدي	المركز العربي للنانوتكنولوجيا/ مصر	عضوا
د. كوثر علي خلف	جامعة ابن سينا للعلوم الطبية والصيدلانية	عضوا
د. محمد مؤيد طه	قسم التخطيط/ الجامعة التكنولوجية	عضوا
د. محمد حسين الضرب	جامعة الكرخ للعلوم	عضوا
د. فراس عزيز راهي	كلية النصور الجامعة	عضوا
د. علي جبر عداي	دائرة بحوث المواد/ وزارة العلوم والتكنولوجيا	عضوا
د. احمد كاظم جاسم	وزارة الصناعة والمعادن/ الشركة العامة للحديد والصلب	عضوا
د. رسل عبد الرسول عباس	وزارة الصناعة والمعادن/ دائرة التطوير والتنظيم الصناعي	عضوا
د. نعم حفصي سعيد	جامعة غرب لندن/ بريطانيا	عضوا
د. معتز ادم محمد	جامعة اركنساس/ الولايات المتحدة	عضوا
د. عمر روجي داود	جامعة فيلادلفيا/ الاردن	عضوا
د. دونا سننبا بنتلي	جامعة لوفيرا/ المملكة المتحدة	عضوا

## لجنة الدعم التقني والفني:

الاسم	جهة الانتساب	الصفة
هدى احمد عبد درويش	مقر الهيئة/ قسم تقنية المعلومات	رئيسا
سرى محمد سليمان	مقر الهيئة/ قسم الموارد البشرية	عضوا
حسام عبد عسلي خضير	مقر الهيئة/ قسم الاعلام والعلاقات العامة	عضوا
حيدر عبد حبيب	مقر الهيئة/ القسم المالي	عضوا
صلاح حسن علي	مقر الهيئة/ قسم تقنية المعلومات	عضوا
نوار صاح مهدي	مقر الهيئة/ قسم تقنية المعلومات	عضوا
محمد بدري محمد علي	مقر الهيئة/ قسم تقنية المعلومات	عضوا
احمد ماجد احمد	مقر الهيئة/ قسم تقنية المعلومات	عضوا
رفل ضيغم عبد المحسن	مقر الهيئة/ قسم تقنية المعلومات	عضوا
دانية عدنان عبد الحافظ	مقر الهيئة/ قسم تقنية المعلومات	عضوا
مصطفى عبد الكريم	مقر الهيئة/ قسم تقنية المعلومات	عضوا
شعاع صفاء عبد الله	مقر الهيئة/ قسم الشؤون العلمية	عضوا
وفاء علوان حسن	مقر الهيئة/ قسم الشؤون العلمية	عضوا
عبير هاشم عبد الله	مقر الهيئة/ قسم الشؤون العلمية	عضوا
لينا كريم امّح	مقر الهيئة/ قسم الشؤون العلمية	عضوا
اسمه طه ابراهيم مقصود	مقر الهيئة/ قسم الشؤون العلمية	عضوا
سارة جمعة عاصم	مقر الهيئة/ قسم الشؤون العلمية	عضوا
علاء الدين احسان	مقر الهيئة/ قسم الشؤون العلمية	عضوا
وفاء احمد نايف	مقر الهيئة/ قسم الشؤون العلمية	عضوا
الاء عبد الرسول	مقر الهيئة/ قسم التنسيق البحثي والعلمي	عضوا
نوفل رياض توفيق	مقر الهيئة/ قسم التنسيق البحثي والعلمي	عضوا
امجد حسن صالح	مقر الهيئة/ مكتب المدير العام	عضوا
بشير غانم عبد الكاظم	مقر الهيئة/ قسم الاعلام والعلاقات العامة	عضوا
سامر طارق محمد	مقر الهيئة/ قسم الاعلام والعلاقات العامة	عضوا
علي كريم حسن	مقر الهيئة/ قسم الاعلام والعلاقات العامة	عضوا
سماح احمد مهدي	مقر الهيئة/ قسم الاعلام والعلاقات العامة	عضوا
نوفل حامد عبد المهدي	مقر الهيئة/ قسم التخطيط	عضوا

### منهاج الجلسة الافتتاحية (القاعة الرئيسية)

الوقت	الفقرة	ت
9:00 – 8 :00	التسجيل	1
9:00	الافتتاح	2
9:05 – 9:00	عزف النشيد الوطني وقراءة سورة الفاتحة على ارواح شهداء العراق وفلسطين	3
9:10 – 9:05	كلمة السيد رئيس اللجنة التحضيرية للمؤتمر	4
9:25 – 9:10	كلمة معالي وزير الصناعة والمعادن الاستاذ الدكتور المهندس خالد بتال النجم المحترم	5
9:25	رئيس الجلسة الدكتور حسين ثامر سلوم (مدير مركز النهريين للطاقات المتجددة / جامعة النهريين) مقرر الجلسة الدكتورة رنا عفيف مجيد (مديرة مركز النانوتكنولوجيا/ الجامعة التكنولوجية)	6
9:45 – 9:25	الورقة البحثية الاولى: الدكتور راند عبد الوهاب اسماعيل/ الجامعة التكنولوجية/ العراق	7
10:05 – 9:45	الورقة البحثية الثانية: الدكتور أحمد عبد العزيز/ كلية الهندسة وعلوم المواد الجامعة الالمانية/ مصر	8
10:20 – 10:05	الورقة البحثية الثالثة: الدكتور قصي فاضل الصالحي/ الجامعة التكنولوجية/ العراق	9
10:50 – 10:20	استراحة	10
1:30 – 10:50	الجلسات البحثية	11

## المتحدثون الرئيسيون (السيرة الذاتية):

### الاستاذ الدكتور رائد عبد الوهاب اسماعيل (العراق)



- رئيس قسم العلوم التطبيقية / الجامعة التكنولوجية
- حاصل على شهادة الدكتوراه في الفيزياء من قسم العلوم التطبيقية الجامعة التكنولوجية ١٩٩٦
- لديه اكثر من ١٩٠ بحث منشور في مجلات سكوبس وكلاريفيت
- اشرف على بحوث اكثر من ٨٠ طالب دكتوراه وماجستير في مجال النانوتكنولوجيا
- والمتحسسات البصرية والخلايا الشمسية
- مؤشر مقياس الانتاجية والاقتباس ( h-index 38 )

### الاستاذ الدكتور قصي فاضل الصالحي (العراق)



- حاصل على شهادة الدكتوراه في الهندسة الكيمائية من جامعة شنجهاي الصين ٢٠٠٤
- عضو جمعية الاغشية الاوربية منذ عام ٢٠٠٩
- مدير وحدة ابحاث تكنولوجيا الاغشية منذ عام ٢٠١٢
- استاذ دكتور قسم الهندسة الكيمائية الجامعة التكنولوجية منذ ٢٠١٣
- جائزة الأستاذ الأول لقسم الهندسة الكيمائية ٢٠١٥
- جوائز شهادة تقدير من منشورات ACS لمراجعة النشاط في عام ٢٠١٦.
- اشرف على بحوث اكثر من ٥٣ طالب دكتوراه وماجستير
- لديه اكثر من ١٢٠ بحث منشور في مختلف المجلات المصنفة عالميا وعدد من المؤلفات
- والمشاركة في العديد من المؤتمرات المحلية والدولية
- مؤشر مقياس الانتاجية والاقتباس (h-index 30)

### الاستاذ الدكتور احمد عبد العزيز (مصر)



- معاون عميد كلية الهندسة وعلوم المواد في الجامعة الالمانية بالقاهرة
- حصل على الدكتوراه من- جامعة دريسدن التقنية بألمانيا ٢٠٠٠
- بحث ما بعد الدكتوراه الذي تم تنفيذه في جامعة أولم ألمانيا حتى عام ٢٠٠٤.
- المواد الوظيفية (المواد المغناطيسية والمواد النانوية والمعادن الزجاجية)
- الطاقة المتجددة (خلايا الوقود الهيدروجيني الأخضر)
- البلورات المفردة والمحفزات ذات الذرة المفردة.
- معالجة مياه الصرف الصحي ومواد تصفية المياه والطاقة البيئية
- الذكاء الاصطناعي وتطبيقاته في البحث والتعليم والنشر
- أكثر من ١٤٠ ورقة بحثية في المجلات والمؤتمرات المحكمة وتأليف ٤ كتب
- الاشراف على اكثر من ٣٠ رسالة ماجستير و اطروحة دكتوراه
- مؤشر مقياس الانتاجية والاقتباس ( h-index 19 )

## الجلسات العلمية

### (اليوم الاول) الجلسة المسائية/ القاعة رقم (1)/ محور البحوث الهندسية

رئيس الجلسة: الدكتور اوس حبيب محمد الطائي (الجامعة التكنولوجية/ قسم الهندسة الكهربائية)  
مقرر الجلسة: الدكتور حسين محمد يوسف (الشركة العامة للصناعات الفولاذية)

الوقت	عنوان البحث	جهة الانتساب	الاسم الكامل	ت
11:15-11:00	Large scale area of low temperature CVD – grown graphene	جامعة تكريت - كلية التربية للعلوم الصرفة	علاء يوسف علي	1
11:30-11:15	Improving the Thermal Performance of a Flat Solar Heater Using Nanomaterials	هيئة البحث والتطوير والصناعي/ مركز بحوث الطاقة المتجددة والبيئة	نجاح جمعة راضي	2
11:45-11:30	Improving properties of the silicon solar cell using glow discharge plasma	هيئة البحث والتطوير والصناعي/ مركز بحوث الطاقة المتجددة والبيئة	نور علي ناصر	3
12:00-11:45	Theoretical Calculation of the Fill factor and Black Dye Efficiency on TiO <sub>2</sub> in a Model Dye-Sensitized Solar Cell	جامعة الكرخ - كلية علوم الطاقة والبيئة	طيف سعد مرضي	4
12:15-12:00	Studying the electrical properties of a solar cell junction coated with nanomaterials consist of a gold, silver and copper using device LCR	هيئة البحث والتطوير الصناعي/ مركز بحوث الطاقة المتجددة والبيئة	شيماء خيون عبد الرضا	5
12:30-12:15	Using Mixed of Nano Aluminum Oxides and Magnesium Nitrate Salt in close loop system to obtain the high Thermal Performance of a Hybrid Photovoltaic Thermal Energy System	هيئة البحث والتطوير الصناعي/ مركز بحوث الطاقة المتجددة والبيئة	علاء حمزة سلوم	6
12:45-12:30	The Possibility and Benefits of Applying Nanofluid to the Oil of Power Transformer	وزارة الكهرباء	احمد بشير	7
1:00-12:45	Implementation of Full Adder using Gate Diffusion Input (GDI) Techniques for Power Reduction	وزارة الموارد المائية/ الهيئة العامة للسدود والخزانات	معن حميد محمد	8
1:15-1:00	Sensor rich cities human centric solution a literature review of smart cities in the age of big data and nanotechnology	وزارة الكهرباء	احمد عليوي عبد الرضا	9
1:30-1:15	Laminated CNTs In Developing Transparent Electrodes for Semitransparent Solar Cells	الجامعة الامريكية - السليمانية	امنية سمير محمد	10



(اليوم الاول) الجلسة المسائية/ القاعة رقم (2)/ محور البحوث الهندسية

رئيس الجلسة: الدكتور عقيل نعمة زعيان (جامعة بغداد / كلية الهندسة/ قسم هندسة الاتصالات والشبكات)  
مقرر الجلسة: الدكتورة سهير كاظم (وزارة الاسكان والاعمار والبلديات/ دائرة بحوث البناء)

الوقت	عنوان البحث	جهة الانتساب	الاسم الكامل	ت
11:15-11:00	Preparation and evaluation of CuO and CeO <sub>2</sub> as an economic nanoparticles catalyst for the synthesis of glycerol carbonate from glycerol carbonylation with CO <sub>2</sub>	جامعة هاوونك (الصين)	جاسم محمد حميد	1
11:30-11:15	Preparation and Addition (Nano TiO <sub>2</sub> ) to bonding mortar (Iraqi cement)	هيئة البحث والتطوير الصناعي/ مركز البحوث الكيميائية والبيروكيميائية	قريش عباس كاظم	2
11:45-11:30	Experimental Study of Improvement of Mechanical Erosion Resistance and Micro hardness for Air Scape Shaft of Flux Pump System in Kufa Cement Plant by Nanotechnology	وزارة الصناعة والمعادن/ الشركة العامة للسمنت العراقية/ معمل اسمنت الكوفة	عدي كاظم محمد الكلابي	3
12:00-11:45	Experimental Study of the effect of Al <sub>2</sub> O <sub>3</sub> Nanoparticles coating on the surface properties of the heat exchanger tube in the Kufa Cement Plant	وزارة الصناعة والمعادن/ الشركة العامة للسمنت العراقية	سمير سامي عبد	4
12:15-12:00	Effect of nano clay on soil behavior	وزارة الاسكان والاعمار والبلديات	انوار لؤي العبيدي	5
12:30-12:15	Fatigue properties of composite materials with cracks	جامعة الإمام جعفر الصادق فرع ذي قار	منذر عبد الزهره دوخي	6
12:45-12:30	An Iraqi Technology to Produce Nano Ceramic Coating for Boilers Heads Burners and Furnaces Torches to Increase Efficiency and Reduce Maintenance	وزارة الصناعة والمعادن/ الشركة العامة للحديد والصلب	باسم عبد الحسن عبد الحي	7
1:00-12:45	Classification, Synthesis, Properties , Applications, Difficulties Facing Nanotechnology	جامعة بغداد - كلية الهندسة - قسم الهندسة الميكانيكة	دلسوز عبد الستار عبد الجبار كرم علي	8
1:15-1:00	Improving Impact Toughness for Welding Joints of Steel by Adding TiO <sub>2</sub> Nanoparticles	وزارة الصناعة والمعادن/ الشركة العامة للسمنت العراقية/ معاونة السمنت الجنوبية/ معمل سمنت الكوفة	علي فخري شاكر	9
1:30-1:15	Influence of the Magnetic Field on the Structural and Morphological Properties of the Hydrothermal Growth of ZnO Nanostructure	الجامعة التكنولوجية	عبد القادر فيصل	10

(اليوم الاول) الجلسة المسائية/ القاعة رقم (3)/ محور العلوم التطبيقية

رئيس الجلسة: الدكتور ليث احمد يعقوب (جامعة بغداد/ كلية العلوم قسم التقنيات الاحيائية)  
مقرر الجلسة: الدكتورة حنان عبدالله علي (جامعة الكرخ/ كلية العلوم)

الوقت	عنوان البحث	جهة الانتماء	الاسم الكامل	ت
11:15-11:00	Using zinc oxide nanoparticles to reduce the effect of ultraviolet radiation on cotton textiles	هيئة البحث والتطوير الصناعي/ مركز الطراز للبحوث النسجية والجلدية	نغم سوادي جاسم	1
11:30-11:15	Biotreatment of Water by Using Ceramic Filters Impregnated with Silver Nanoparticles	الجامعة التقنية الوسطى - الكلية التقنية الهندسية بغداد	مريم فراس محسن	2
11:45-11:30	Applications of nanomaterials in dyes	هيئة البحث والتطوير الصناعي/ المركز الوطني للتعبئة والتغليف	عبير عبد صالح	3
12:00-11:45	The use of nano calcium carbonate to improve the specifications of coatings	وزارة الصناعة والمعادن/ الشركة العامة للصناعات التعدينية	هاني عبدالقادر سلطان	4
12:15-12:00	Synthesis and characterization of nanolaminar of honey wax and its Use in Prolonging Shelf Life of some fruits and vegetables	وزارة العلوم والتكنولوجيا	ليبي احمد الزبيدي	5
12:30-12:15	Preparation and evaluation of efficacy of a vegetable disinfectant nano as antibacterial	هيئة البحث والتطوير الصناعي/ مركز بحوث ابن البيطار	فلاح حسن احميدي	6
12:45-12:30	Preparation and evaluation of the efficacy of a plant-based nano-disinfectant from the waste of pressing flaxseed as an antimicrobial	هيئة البحث والتطوير الصناعي/ مركز بحوث ابن البيطار	فلاح حسن حميدي	7
1:00-12:45	Developing the biological effectiveness of local dyes by adding nanomaterials and comparing them with international dyes for wet places	هيئة البحث والتطوير الصناعي/ المركز الوطني للتعبئة والتغليف	رشا فوزي داود	8
1:15-1:00	Synthesis and Characterization of Nanocomposites (Metal Oxides – Polyvinyl alcohol – Halloysite) By Hydrothermal Method and Anti-Bacterial Effect	هيئة البحث والتطوير الصناعي/ مركز البحوث الكيماوية والبتروكيماوية	بسام موفق عبود	9

(اليوم الثاني) الجلسة الصباحية/ القاعة رقم (1) / محور البحوث الهندسية

رئيس الجلسة: الدكتور محمد عبد الله نعمان (الجامعة التكنولوجية/ قسم الهندسة الكهربائية)  
مقرر الجلسة: الدكتور محمد جابر (هيئة البحث والتطوير الصناعي)

الوقت	عنوان البحث	جهة الانتساب	الاسم الكامل	ت
9:15-9:00	Designing DAQ system for Estimation Transfer Function of a joint Robotic Arm using FPGA Nano Technology	وزارة الصناعة والمعادن/ الشركة العامة للصناعات الكهربائية والإلكترونية	فالح صالح مهدي	1
9:30-9:15	Design and Selection of Rubber Compounds for Tread of Sukhoi Su-25 - Attack Aircraft Tyres By Using Nano Zinc Oxide Have Been Prepared In Laboratory	وزارة الصناعة والمعادن/ الشركة العامة للصناعات المطاطية والاطارات	محمد محيي علي	2
9:45-9:30	Practical Technique for Hollow Fiber Membrane Production	هيئة البحث والتطوير الصناعي/ المركز الوطني للتعبئة والتغليف	عبدالله عدنان عبد الكريم	3
10:00-9:45	Studying the effect of adding silica nanoparticles on the properties of polymer modified asphalt	وزارة الصناعة والمعادن/ الشركة العامة للصناعات التعدينية	عبد الرزاق عزيز سبهان	4
10:15-10:00	Synthesis and Characterization of Magnesium Aluminum Oxide Nanoceramic via Soft Chemical Process	وزارة الاسكان	احمد فاروق	5
10:30-10:15	Improving the Electrical and Optical Properties of a Photodetector Using Silver Nanoparticles Deposited on Porous Silicon	كلية الامام الكاظم	حيدر عايد ناصر	6
10:45-10:30	Mechanical Behavior Characterization of Thermoplastic Elastomers Reinforced by Nanoparticles: Numerical and Experimental Study	وزارة الصناعة والمعادن/ الشركة العامة للصناعات المطاطية والاطارات	عماد كاظم نجم	7
11:00-10:45	Examine the Effectiveness of Nanoceramics Coating on Enhancing Car Surface Performance Using Different Techniques	وزارة الصناعة والمعادن/ الشركة العامة لصناعة السيارات والمعدات	سامح فحطان جواد	8
11:15-11:00	Effect of nano MgO on improving electrical conductivity of electrospun Styrofoam membranes	وزارة العلوم والتكنولوجيا	نور محمد جلال	9
11:30-11:15	Structural, Optical, and Electrical Characteristics of Titanium Dioxide Thin Films Prepared by Pulsed Laser Deposition	هيئة البحث والتطوير والصناعي/ مركز بحوث الطاقة المتجددة والبيئة	نور علي ناصر	10

(اليوم الثاني) الجلسة الصباحية/ القاعة رقم (2) / محور البحوث الهندسية

رئيس الجلسة: الدكتور كريم خلف محمد (جامعة النهريين/ مركز بحوث النهريين للطاقات المتجددة)  
مقرر الجلسة : الدكتور صفاء عبد الرسول علي (جامعة بغداد/ معهد الهندسة الوراثية والتقنيات الاحيائية)

الوقت	عنوان البحث	جهة الانتساب	الاسم الكامل	ت
9:15-9:00	Studying The Effect of Nanoparticles on The Separation Process of Oil Emulsions	وزارة العلوم والتكنولوجيا	خزعل حميد خزعل	1
9:30-9:15	Investigation Study of sound absorption performance of a Nano perforated panel	وزارة الصناعة والمعادن/ الشركة العامة لصناعات النسيج والجلود	اسراء عامر جميل	2
9:45-9:30	A comprehensive Analysis of the Corrosion Behaviour and Some Other Properties of Cp-Ti after Coating with a Mixture of Chitosan and Hydroxyapatite Nano Particles	جامعة بغداد - كلية الهندسة	عدي ابراهيم عبدالله	3
10:00-9:45	The Impact of pH on the Properties of Hydrothermally Synthesized CeO2 Nanoparticles	جامعة الانبار	ياسر سليم ياسين	4
10:15-10:00	Analyzing the Evolution of Metal Oxide Nanoparticles in Environmental Research	المدرسة العليا للاساتذة بالقبة - الجزائر	حياة ميسوني	5
10:30-10:15	Sustainable Environmental Improvement Of Building Envelopes Using Nanomaterial Technologies	جامعة الموصل - كلية الهندسة - قسم هندسة العمارة	بسام احسان الحافظ	6
10:45-10:30	The Effect of Adding Alumina Al2O3 Nanoparticles on the Wear Resistance of Aluminum Alloy (7049)	جامعة بغداد - كلية الهندسة - قسم الهندسة الميكانيكية	عبدالله ضايح عاصي	7
11:00-10:45	Nanophotonic Structure for Realizing Plasmonic NOT Logic Gate Based on Dielectric-Metal-Dielectric Formation at 1.55µm	جامعة الكوفة - كلية الهندسة	سيف حسن عبد النبي	8
11:15-11:00	Optical and Structural Characterization of Active Spinel Cathodes of Li-Ion Battery	الجامعة المستنصرية - كلية التربية الاساسية	وليد خالد محمود محمد	9
11:30-11:15	Impact of Nanomaterials in Oil Well Completion: A Comprehensive Overview	الجامعة الامريكية - السليمانية	سافا دلوار قوباد	10

(اليوم الثاني) الجلسة الصباحية/ القاعة رقم (3) // محور العلوم التطبيقية

رئيس الجلسة: الدكتور احمد حربي العزاوي (جامعة بغداد/ معهد الهندسة الوراثية والتقنيات الاحيائية)  
مقرر الجلسة: الدكتورة كلبوي عبد المجيد (جامعة بغداد/ كلية الزراعة)

الوقت	عنوان البحث	جهة الانتساب	الاسم	ت
9:15-9:00	Green synthesis of silver nanoparticles using alcoholic extract of <i>Acacia armata</i> L.leaves	جامعة ديالى - كلية التربية للعلوم الصرفة - علوم حياة	اسيل كاظم هادي	1
9:30-9:15	Nano-sized catalysts in organic efficiency and toxicity	منظمة الطاقة الذرية العراقية	كفاء خلف حامد	2
9:45-9:30	Nano-lycopene Preparation from Tomato Waste and Its Use to Extending local Cream Shelf Life	جامعة بغداد - كلية الزراعة	ايمان حميد الانباري	3
10:00-9:45	Synthesis and Identification of zinc oxide nano hybrid compound with silver nanoparticle and proof of its effectiveness in inhibition of antibiotic	جامعة كربلاء - كلية العلوم	يسر نوري عبد الامير	4
10:15-10:00	Toxicity of polymeric nanocapsules prepared from Moringa oliefera leaf extract against the larvae of <i>Culex papiens</i> (Diptera: Culicidae)	وزارة العلوم والتكنولوجيا	حازم عيدان عبد الحسن	5
10:30-10:15	Preparation and Study of the Effect of Ultrasound Exposure on the Properties of Graphene Oxide Nanosheets and their Antimicrobial Effectiveness	جامعة الانبار	عبدالله كسار رجي	6
10:45-10:30	Preparation of Nano Activated carbon from Alhagi plant for detecting latent fingerprint for forensic applications	جامعة بغداد - كلية الهندسة الخوارزمي - قسم الهندسة الكيميائية الاحيائية	علاء كريم محمد	7
11:00-10:45	Fabrication of nanocellulose membrane for food packaging applications	هيئة البحث والتطوير الصناعي/ المركز الوطني للتعبئة والتغليف	ميسر سمير حميد	8
11:15-11:00	Green synthesis of Copper – Iron nanoparticles by Iraqi propolis to removal cadmium in drinking water	وزارة العلوم والتكنولوجيا/ دائرة بحوث المواد	رياض شفاف حسين العتابي	9

(اليوم الثاني) الجلسة المسائية/ القاعة رقم (1) / محور البحوث الطبية والدوائية

رئيس الجلسة : الدكتور محمد طالب التميمي (جامعة القاسم الخضراء/ قسم التقنيات الاحيائية)  
مقرر الجلسة : الدكتورة الهام عبد الهادي خلف (هيئة البحث والتطوير الصناعي)

الوقت	عنوان البحث	جهة الانتساب	الاسم	ت
11:15-11:00	Antibacterial and Antitumor activity of Biosilver Nanoparticles Synthesized from Bacteria	وزارة الصناعة والمعادن/ الشركة العامة للصناعات البتروكيمياوية/ ميسان/ العراق	ثرثيا محبس ديوان	1
11:30-11:15	Effect of <i>Lycium barbarum</i> Plant Alcoholic Extract Loaded With Some Nanoparticles on The Physiological and Biochemical Functions of Rats	هيئة البحث والتطوير الصناعي/ قسم الشؤون العلمية	هاشم محمد زهراو	2
11:45-11:30	Formulation and Characterization of Mupirocin Nanomicelles in Insulin-Based Gel for Dermatological Application	جامعة البصرة - كلية الصيدلة	ميساء بناي زبيري	3
12:00-11:45	Evaluation of genotoxicity of Silver nanoparticles in Monocytic THP-1 cells using comet assay	جامعة النهرين - كلية الطب	رويدة عبد الامبر مصطفى	4
12:15-12:00	Synthesizes Smart of Fe3O4 – Polymeric Nano system by Co-Precipitation Method and Study its Application as Nanocarrier for Treatment of Fibrosarcoma Cell Line in BALB/c Mice	وزارة الصناعة و المعادن/ دائرة التطوير والتنظيم الصناعي	رسل عبد الرسول عباس	5
12:30-12:15	gelatin/plga based microspheres as a delivery platform for chondrocytes	جامعة البيان - كلية الصيدلة - فرع الصيدلانيات	زهراء مصطفى الزبيدي	6
12:45-12:30	pharmaceutical formula from the aqueous nanoextraction of Lntana camara plant seeds in spray form to treat bacterial and fungal skin infections	هيئة البحث والتطوير الصناعي/ مركز بحوث وانتاج الادوية البيطرية	احمد جبير عيسى	7
1:00-12:45	Preparation of Nano zirconium metal-organic framework (MOFs), and used as a drug carriers	وزارة العلوم والتكنولوجيا	عبدالله سامي مطلق	8
1:15-1:00	Preparation of auto-cleanable cement using nano-additives	وزارة الإسكان والاعمار والاشغال العامة	خالد وليد صابر	9

(اليوم الثاني) الجلسة المسائية/ القاعة رقم (2) / محور البحوث الطبية والدوائية

رئيس الجلسة: الدكتورة كوثر علي خلف (جامعة ابن سينا للعلوم الطبية والصيدلانية)  
مقرر الجلسة: الدكتورة نسرین خليل عبد الامير (جامعة بغداد/ كلية العلوم للبنات)

الوقت	عنوان البحث	جهة الانتساب	الاسم	ت
11:15-11:00	Enhancing HIV Antigen Detection Sensitivity: Evaluation of Nanoparticle-Based ELISA Diagnostic Kit	هيئة البحث والتطوير الصناعي/ مركز الرازي للبحوث و انتاج العدد التشخيصية	رونق عبد الرزاق احمد	1
11:30-11:15	A pharmaceutical formulation of nano sodium bentonite powder, 20% to get rid of a flatoxin toxins in Feed	هيئة البحث والتطوير الصناعي/ مركز بحوث و انتاج الادوية البيطرية	فريال مجيد مهدي	2
11:45-11:30	Protective effects of Nano- herbal extract on sugar and lipid in diabetic mice	هيئة البحث والتطوير الصناعي/ مركز الرازي للبحوث و انتاج العدد التشخيصية	عواطف ابراهيم محمد	3
12:00-11:45	Veterinary Therapeutic and Prophylactic Nano Cream	هيئة البحث والتطوير الصناعي/ مركز الرازي للبحوث و انتاج العدد التشخيصية	عواطف ابراهيم محمد	4
12:15-12:00	Application and studying silver nanoparticles as antidiabetic agent and the role of LED (light emitting diode) or laser at the range (395-450) nm on the activity of drugs	الجامعة المستنصرية	عباس عبد لطيف	5
12:30-12:15	Enhancing the antibacterial activity of Erythromycin with titanium oxide nanoparticles against pathogenic bacteria	جامعة بغداد - كلية الطب البيطري	بان صاحب عبد النبي	6
12:45-12:30	Synergistic antimicrobial therapy using selenium metal-Nanoparticles and Gentamycin for the treatment of multidrug	جامعة بغداد - كلية الطب البيطري	بان صاحب عبد النبي	7
1:00-12:45	Using colloidal gold nanoparticles with monoclonal antibodies for prepare rapid test strips to diagnose KOI Herpes Virus in Carp Fish	هيئة البحث والتطوير الصناعي/ مركز الرازي للبحوث و انتاج العدد التشخيصية	الهام عبد الهادي خلف	8





## 1-Optical and Structural Characterization of Active Spinel Cathodes of Li-Ion Battery

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### Abstract

Spinel compound of the  $\text{LiCo}_{0.50}\text{Mn}_{1.50}\text{O}_4$  (LCMO) has undergone synthesis as a cathode active material for the lithium-ion battery types utilizing the sol-gel method in the present work. The substance has been exposed to TGA (i.e. thermo-gravimetric) study. The sample has been calcined in the air for a period of 12hrs at temperatures of 700°C, 850°C, and 1000°C degrees centigrade in order to examine the differences in the morphological as well as structural features. Powder that has been crystallized in phase structure space group  $\text{Fd}\bar{3}m$  and has arbitrary orientations, based on XRD measurements. The surface morphology of the LCMO powder includes nano-grains crystallite with the even coverage of the sample surface and arbitrarily oriented grains. The temperature of annealing results in increasing band gap energy as crystal lattice expands and inter-atomic bonds weaken, leading to less energy required for breaking a bond and getting electron in conduction band as it has been shown from the results of the UV-Vis. Charging and discharging capacities have been of  $121 \frac{\text{mAh}}{\text{g}}$  &  $122 \frac{\text{mAh}}{\text{g}}$  delivered by  $\text{LiCo}_{0.50}\text{Mn}_{1.50}\text{O}_4$  cathode. In addition to that, a 94% Coulombic efficiency has been obtained for cathode.

**Keywords:** Li ion battery, Space group, Spinel cathode, TGA, Discharge capacity.



## 2-Improving the Thermal Performance of a Flat Solar Heater Using Nano Aluminum Oxide

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### Abstract

In this research, the using, and improving of aluminum oxide ( $Al_2O_3$ ) nanoparticles with various concentrations in flat solar heater has been studied. Experimental investigation was conducted on a flat-plate solar collector connected to a hot water storage tank through a heat exchanger. The collector's operation relies on the use of  $Al_2O_3$  nanomaterial, which is dispersed in water. The  $Al_2O_3$  Inexpensive nanomaterials have studied due to the low cost compared to other nanomaterials, and its capability to store, and absorb infrared radiation covering wavelengths in the spectral range of 0.4 - 0.75  $\mu m$ . In this experimental study,  $Al_2O_3$  nanofluid dispersed in water and ethylene glycol was used. Various flow rates of up to 100 I/hr were successfully studied. Nanomaterials with a diameter of 30 nm, a weight of 3 g, and a concentration of 0.046% of the  $Al_2O_3$ -water-ethylene-glycol nanofluid was used. The results show that a concentration of 0.046% provides the best performance, particularly at a flow rate of 40 I/hr, leading to an approximately 23.6% increase in the heater efficiency. Simultaneously, the experimental results show an increase in the temperature of the water in the storage tank, reaching to 68°C due to increased volumetric flow rate causing turbulence in the working medium. This turbulence leads to a better performance for the solar collector.

**Keywords:** Flat-plate solar heater, Nanosized aluminum oxide, Thermal conductivity.



### 3-The Effect of Adding Alumina Al<sub>2</sub>O<sub>3</sub> Nanoparticles on the Wear Resistance of Aluminum Alloy (7049)

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#### Abstract

In this research, aluminum composite matrix (ACM) was prepared aluminum alloy (AA7049) reinforced with nanoparticles of alumina with a weight percentage of (2, 4, 6, 8) wt.% Al<sub>2</sub>O<sub>3</sub> with a grain size of (25-50) microns. The composite matrix was prepared using the Vortex method, where Al<sub>2</sub>O<sub>3</sub> nanoparticles were added to the molten, then mixed using an electric mixer to create a vortex, then the molten mixture was poured into a cylindrical metal mold. After that, the samples were cut and prepared for processing. Examination and testing of wear, hardness, density, and study of the microscopic structure of the models and comparison between them. The results obtained through this study showed that the wear resistance of the composite materials was improved as a result of the addition of Al<sub>2</sub>O<sub>3</sub> nanoparticles compared to the base alloy, and the wear resistance of the composite materials was higher than the wear resistance of the base alloy (AA7049). The highest wear resistance was obtained when adding 8% of Al<sub>2</sub>O<sub>3</sub> nanoparticles. The addition of Al<sub>2</sub>O<sub>3</sub> nanoparticles, in the above ratios contributed to improving the hardness values, which was reflected in the improvement in wear resistance. This improvement in properties increases with the increase in the percentage of adding Al<sub>2</sub>O<sub>3</sub> nanoparticles, to the base alloy. As for the density property, its values for the composite materials decreased with respect to the base alloy and by a small percentage when the Al<sub>2</sub>O<sub>3</sub> reinforcing particles were added.

**Keywords:** Aluminum Composite Matrix (ACM), Aluminum Alloy (AA7049), alumina Al<sub>2</sub>O<sub>3</sub>, Wear.



## 4-Antibacterial and Antitumor activity of Biosilver Nanoparticles Synthesize from Bacteria

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### Abstract

Metal nanoparticles were widely utilized in biotechnology and biomedicine for a variety of applications, in this research we synthesize AgNPs (silver nanoparticles) with a cost effective, environmentally friendly, bacteria were collected from different soil samples, isolated, purified in culture media, identification genotypically by 16rRNA sequencing analysis, then compared with NCBI GenBank, then biosynthesis of silver nanoparticles using bacteria for extracellular synthesis, then used this silver nanoparticles as antibacterial on pathogenic bacteria, and antitumor, the results showed that the isolated strain was *Pseudomonas Mosselii* strain XG1-1-2, the color change to dark brown was the first indicated of the AgNPs formation. AgNPs characterize chemoPhysically, biogenic AgNPs had a strong antibacterial action against Gram-positive and Gram-negative pathogenic bacteria isolated from Al-Sadr hospital in Misan city (identified by VITEK2), the largest inhibition zone is 49 mm on *Staphylococcus hominis*, antitumor activity of extracellular biosynthesized AgNPs were determined using the MTT test against breast cancer cells (MCF7 cell line), showed high results, AgNPs inhibition breast cancer cell line by about 61.35% , So there was different biomedical approaches can benefit from AgNPs as antibacterial and anticancer agents with considerable results as shown in our research.

**Keywords:** Antibacterial, Antitumor, Silver nanoparticles.



## 5-Analyzing the Evolution of Metal Oxide Nanoparticles in Environmental Research

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### Abstract

The research and attention devoted to nanoparticles, specifically metal oxide nanoparticles, are instrumental in driving scientific exploration and technological advancements towards sustainable solutions for energy and environmental challenges. In this context, we focus on the remarkable surge in research dedicated to metal oxide nanoparticles, evident in the consistent and substantial growth of annual publications. The objective of this study is to analyze the research findings on metal oxide nanoparticles within the realm of environmental sciences. The number of publications, in the ScienceDirect database, pertaining to these nanoparticles has experienced a significant increase, rising from 504 in 2000 to an impressive 47,483 by 2023. As a specific example of a metal oxide nanoparticle, nickel oxide nanoparticles have been chosen. Their effectiveness in water treatment, air pollution control, and energy conversion has displayed significant potential, primarily due to their ability to generate reactive oxygen species and maintain stability. The results of these studies indicate that NiO nanoparticles possess favorable photocatalytic characteristics and can potentially be used as an effective solution for removing dyes from water, with a removal efficiency of up to 99.6% for Methylene blue (MB) dye.

**Keywords:** Metal Oxide Nanoparticles. Nickel Oxide Nanoparticles. Energy and Environmental Challenges. Sustainable solutions. Water treatment.

## 6-The Possibility and Benefits of Applying Nanofluid to the Oil of Power Transformer

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### Abstract

Power transformers are essential components of the electric power system, as they enable the transmission and distribution of electricity at different voltage levels. However, power transformers are also vulnerable to various problems that can affect their performance and lifespan, such as overheating, insulation degradation, and electrical breakdown. To prevent or mitigate these problems, it is important to use a suitable transformer oil, which is a liquid that fills the transformer tank and serves as a coolant and an insulator. One of the emerging solutions for improving the transformer oil is to use nanofluid, which is a liquid that contains dispersed nanoparticles of different materials. This paper provides a comprehensive review of the existing literature on nanofluid as a transformer oil, and discusses its preparation methods, testing procedures, and performance effects. The paper reveals that nanofluid can significantly enhance the thermal and dielectric properties of transformer oil, such as thermal conductivity, specific heat, viscosity, breakdown voltage, and partial discharge. These enhancements can result in better cooling and insulation functions of power transformers, and thus increase their reliability and efficiency. However, the paper also acknowledges some challenges and future directions for implementing nanofluid in power transformer insulation, such as how to ensure the stability, compatibility, and cost-effectiveness of nanofluid. The paper suggests more research to address these issues and to optimize the nanofluid composition and operation parameters for practical use. The paper concludes that nanofluid is a promising transformer oil that can offer many benefits for the electric power system.

**Keywords:** nanofluid, transformer oil, cooling and insulation functions.



## 7-Sustainable Environmental Improvement of Building Envelopes Using Nanomaterial Technologies

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### Abstract

Urban infrastructure heavily relies on buildings, yet their construction and maintenance contribute significantly to resource depletion and greenhouse gas emissions. To address these challenges and foster environmental sustainability in the construction sector, there is a growing interest in leveraging innovative technologies such as the use of nanomaterials in developing building coverings with the aim of enhancing sustainability. Nanotechnology offers a novel approach by employing sub-micron materials to engineer building coverings that exhibit improved energy efficiency, corrosion resistance, and enhanced thermal and acoustic insulation. During this research, the comprehensive analysis of the environmental, health, and economic implications associated with the incorporation of nanomaterials in building coverings will be analyzed. The research aims to provide recommendations for sustainable practices and policies that can be adopted to preserve the environment and improve people's quality of life. It also aims to provide a comprehensive assessment of the environmental impacts of using nanomaterial to improve building covers and enhance their sustainability, in addition to discussing the challenges that can be faced during the application of these technologies and policies that can be adopted to enhance the sustainable use of nanomaterial in the construction industry, as nanomaterial are considered a promising technology in the field of building design. Environmental and sustainable, but making optimal use of them requires a deep understanding of their effects on the environment and health, in addition to directing attention towards innovations related to nanomaterial and improving our environment and its quality in proportion to current environmental challenges.

**Keywords:** Nanomaterials - Building Envelopes - Sustainable Design - Environmental Efficiency - Sustainability

## 8-Fatigue properties of composite materials with internal cracks

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### Abstract

The current work deals with studying the fatigue behavior of composite materials that contain internal cracks (adhesive tape or wax) and studying the effect of TiO<sub>2</sub> nanomaterials. For this purpose, the nanocomposite material was manufactured by using transparent epoxy with one layer of glass fibers, which has a fixed weight of 10 wt% of the weight of the total sample. After that, titanium dioxide nanoparticles were mixed in proportions of (1 wt%, 2 wt%, and 3 wt %) with epoxy using an ultrasonic device to ensure homogeneity and even distribution of nanomaterials throughout all parts of the complete sample. The samples were manufactured according to ASTM specifications. The results obtained after testing using a fatigue device indicated that internal cracks negatively affect the samples because they are considered weak areas for the sample. However, with the addition of nanomaterials, it was found that samples containing TiO<sub>2</sub> at 3 wt% had a longer lifespan than others. The results obtained through the SEM test also showed that nanomaterials grow on the sides of the internal crack. This explains that nanomaterials work to delay the failure of samples that contain internal cracks. The effect of the internal crack (wax) was significant compared to the internal crack (adhesive tape).

**Keywords:** Composite materials; Crack; Fracture mechanics; Polymer; Mechanical properties, fatigue





## 9-An Iraqi Technology to Produce Nano Ceramic Coating for Boilers Heads Burners and Furnaces Torches to Increase Efficiency and Reduce Maintenance

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### Abstract

A new technology for produce Nano-ceramic coating which are using polyphosphate and silicone co-polymers were synthesized by the sol-gel process by reaction kinetics of the organometallic compounds for coating the heads burners of steam boilers and furnace torches by Nano-ceramic coating carbide silicone based surface apply in the first line reformer of the state company of fertilizers-south region in Basra C141 and B141 positions by using atomization method (cold spraying) that coated stainless steel burners surface with inert complex ceramic coating for increase mechanical properties. Characterization of the obtained coatings was carried out by scanning electron microscopy (SEM) and energy-dispersive X-ray spectrometry (EDXs), the elements distribution as Si% 15.32, O% 35.93, C% 37.71, K% 3.13, Cl% 0.42, Na% 7.46 .Whereas distribution in other position Si% 6.40, C% 34.54, Fe% 13.17. The results indicate iron phases interferences with the coating materials phases a layer Nano-ceramic carbide silicone base with a uniform nanoparticles distribution coating of with cross section thickness more than 1200 um because calcination reaction. Furthermore, there are no gaps between the substrate surface alloys and Nano ceramic coating compounds because chemically bonding reaction with needle distribution green color although not used thermal pigments because of the presence chromium in the stainless steel alloy, which led to an increase hardness about 168% HB and adhesion pulling test more than 20 MPa according to ASTM D4541. Therefore, this method is an Iraqi technology for increase operation the efficiency, increase functional life and reduce maintenance.

**Keywords:** Sol-gel system, Oxidation, Nano ceramic, Corrosion, Furnace.





## 10-Experimental Study of Improvement of Mechanical Erosion Resistance and Micro hardness for Air Scape Shaft of Flux Pump System in Kufa Cement Plant

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### Abstract

Erosion in cement transport pipelines in cement industry is very important because it has great economic importance in this field. Therefore, in this research, the effect of nanomaterial coating on erosion resistance and hardness of the base material steel 37 been studied. Zinc oxide nanoparticle ZnONPs and tungsten carbide WCNPs have been used to coating the steel -37 spindle shaft which is responsible for opening and closing the air and cement outlets in the air scape system in Kufa cement plant. After 400 hr operation time the results showed that WCNPs and ZnONPs are the best materials for spindle axis coating. The shaft diameter was measured every 100 OF working hours, the results showed that the wear rate decreased significantly when coating by two materials. The hardness test was also done for the sample material for the base material steel 37 the results showed that WCNPs was better than ZnONPs. A scanning electron microscope (SEM) was also carried out to measure the thickness of the coating layer and found it to be approximately 0.7 mm.

**Keywords:** air scape, wear resistance, flux pump.



## 11-Biotreatment of Water by Using Ceramic Filters Impregnated with Silver Nanoparticles

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### Abstract

An attempt was made to synthesize nanosilver particles (AgNPs) from Sidr plant (*Ziziphus* plant) and later these AgNPs were used for the removal of microbial effect in water. The AgNPs were prepared from Plant extract of *Ziziphus Spina Christi* L. with silver nitrate solution under microwave irradiation for different exposure time. Fourier Transformation infrared Spectroscopy (FTIR), UV-Vis spectrophotometer and Atomic Force Microscopy (AFM) were used to characterize AgNPs. UV-Vis. Spectra showed ample evidences for the formation of AgNPs. The FTIR spectroscopic analysis confirmed participation of bio-molecules in the *Ziziphus* leaves extract as reducing agents. The process parameters that affect the AgNPs synthesis from *Ziziphus* leaves extract, such as AgNO<sub>3</sub> concentration (1,3,5,7 and 9 mM), microwave exposure time (10,20,30,40,50,60,70,80 and 90 sec), amount of extract volume (1.5,2,4,6 and 8 ml) and pH of the solution were also studied in the range (2.5, 4.5, 6.5 and 9.5). The results showed the best conditions for AgNPs synthesis from *Ziziphus* leaves extract was 5 mM AgNO<sub>3</sub> concentration, 40 sec of microwave exposure time, extract volume amount of 2 ml in a neutral pH environment which gives the best average diameter of AgNPs (80 nm). Ceramic filter and tablets were prepared by hand molded method from local Iraqi clay which was mixed with different combustible materials (date palm seed, sawdust and charcoal) with mixed ratios of clay:charcoal (10:1, 10:2, 10:3 and 10:4). The results showed that charcoal used is a better combustible material. The maximum apparent porosity (50.52% porosity) was obtained at a mixing ratio of clay:charcoal of 10:4. The ceramic tablet was then impregnated with a 22 mg/L of the prepared AgNPs and dried in an oven for 6 hrs at 50 °C. Six tablets were put inside a ceramic filter with water river to be filtered at a rate of 1 liter/ hr. Total Bacteria Count (TBC) was measured in the river and filtered water and gave a result of thick growth for the river water and 0.001 CFU/ml for filtered water which shows that silver nanoparticles have excellent antimicrobial activity.

**Keywords:** Ceramic filter, Silver Nanoparticles, Green synthesis, *Ziziphus Spina Christi*, FTIR, TBC.



## 12-Classification, Synthesis, Properties, Applications, Difficulties Facing Nanotechnology

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### Abstract

Nanomaterials have received attention of scientists and researchers since several years ago and still continue to this day and the reason behind this belongs to the properties of this material that are superior to their parent materials. In this paper we present in an easy and smooth way the overview of nanomaterials that make the reader or researcher obtain clear information and easily accessible by presenting everything related to nanomaterials including their history and classifications in terms of shape, size, nature, and engineering or artificial made by human to enhance certain properties as well as presenting methods for synthesis: top-down method and bottom-up method and their branches. In this paper we also presented the most important properties that distinguish these materials from bulk such as physical, mechanical, optical properties and other properties and discuss the application in many fields such as engineering, medical, environmental and other applications. Finally we talk about the challenges that face these materials whether in terms of synthesis, insulation or disposal after use.

**Keywords:** Challenges facing nanomaterials, Properties of Nano materials, Nano Materials, Nano technology, Synthesis method.



### 13-Improving Impact Toughness for Welding Joints of Steel by Adding TiO<sub>2</sub> Nanoparticles

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#### ABSTRACT

The using of nanotechnology in the welding process has great importance in developing the mechanical properties of welding joints for metals. This paper investigated the effect of addition TiO<sub>2</sub> NPs to welding joints to improving the Impact toughness property of the welding joints. The cold spray coating method of the nanoparticles are used to adding the TiO<sub>2</sub> NPs to the welding joints during the welding process. Three weight fractions are used for TiO<sub>2</sub> NPs (0.75 %, 1.5 %, and 2 %). The testing samples were prepared for Impact test, and microstructure by SEM. The results show the increasing in Impact toughness of welded joints with an increase of TiO<sub>2</sub> NPs concentrations. The average Impact toughness for the welded sample without TiO<sub>2</sub> NPs. was (162.4 J), while the average Impact toughness for the welded sample with (1.5) % TiO<sub>2</sub> NPs. was (231.2 J) with improving rate of (42.36%). The Microstructure images by SEM show the adding of TiO<sub>2</sub> NPs decreases the grain size and homogenous region in welded joints cross-section compared with a sample without adding TiO<sub>2</sub> NPs. The EDS analysis show that increase Ti contain and decrease (Mn and Si) contain with increase TiO<sub>2</sub> NPs

**Keywords:** Steel welding; TiO<sub>2</sub> nanoparticles; Nano welding; Impact toughness

## 14-Effect of *Lycium barbarum* Plant Alcoholic Extract Loaded with Some Nanoparticles on The Physiological and Biochemical Functions of Rats

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### Abstract

The alcoholic extract of the *Lycium barbarum* plant was prepared by soaking using ethanol alcohol and its effect was studied with or without the addition of two types of chitosan nanoparticles (ChNPs) and nanotitanium dioxide (TiONPs) together or separately on the biochemical and physiological characteristics: weight average and blood fat level, which included total cholesterol, Triglycerides, low-density lipoproteins, and liver enzymes (AST, ALT, and ALP) were tested on adult male Sprague-Dawley rats. Laboratory animals were divided into six groups in six replicates, each of which included a control group (C) and five groups fed a standard ration and dosed with 2 g/kg. L. barbarum extract (L), ChNPs 500 mg/kg (Ch), TiO<sub>2</sub>NPs 500 mg/kg (T), L. barbarum extract with ChNPs (L+Ch) and L. barbarum extract with TiO<sub>2</sub>NPs (L+T). After the end of the feeding period for the experiment 21 days, the results showed that the daily weight gain of the members of the group of rats fed a standard diet was (0.53) g/day and the final weight gain was (11.13) g, while the animals were dosed with treatment L led to a reduction in the rate of daily change in body weight and the amount of the final weight loss. Dosing groups of rats with the treatments Ch, T, L + Ch, L + T reduced the rate of daily change in body weight and the amount of the final weight loss, as the extract model with chitosan (L + Ch) achieved the highest percentage of weight loss. The results showed a significant decrease ( $p \leq 0.05$ ) in the rate of cholesterol, triglycerides and low-density lipoproteins in group (L), (T), (L+Ch) compared with (C), and the extract form with chitosan was the best in lowering total cholesterol level, and reducing harmful cholesterol, raising beneficial cholesterol. Whereas, with treatments (T), (L + T) led to an increase in blood fats. A significant decrease in the level of liver enzymes (AST, ALT, ALP) was observed in animals treated with treatments (L), (Ch), (L+Ch) compared with (C), while treatments (T, (L+T) led to an increase in the concentration of liver enzymes.

**Keywords:** Chitosan *Lycium barbarum*, Titanium dioxide



## 15-Formulation and Characterization of Mupirocin Nanomicelles in Insulin-Based Gel for Dermatological Application

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### Abstract

**Aim:** To produce and analyze mupirocin nanomicelle (MP-NM) in insulin-based gel. **Procedures:** MP-NM was prepared using solvent evaporation technique with Tween 80 as a surfactant. Hydroxypropyl methyl cellulose (HPMC) polymer was used to prepare gel. MP-NM was characterized by globular diameter, polydispersity index (PDI), pH, entrapment efficiency (EE), and transmission electron microscopy (TEM). NM MP release was studied in vitro. **Results:** The revolutionary MP-NM in insulin-based gel dissolves MP completely without precipitation due to its unique physical and chemical properties. MP had  $8.64 \pm 0.2$  nm globular diameter, high EE ( $98.85 \pm 0.01\%$ ), and normal homogeneous dispersion (PDI,  $0.143 \pm 0.003$ ) in NM. MP's formula showed rapid first-order kinetics release. **Conclusion:** To our knowledge, this is the first MP-NM nano-drug delivery system employing insulin-based gel. It has promising pre-clinical and clinical uses.

**Keywords:** Mupirocin, nano-drug delivery, nanomicelle, Tween 80



## 16-Preparation of Nano Activated carbon from The Alhagi plant for detecting latent fingerprints for forensic applications

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### Abstract

The objective of this work is to produce nano-activated carbon fingerprint powder derived from the Alhagi plant that is used to reveal latent fingerprints on different non-porous surfaces. In preparing the nano-activated carbon, three parameters were studied: activation time, activation temperature, and impregnation ratio. The prepared nano-activated carbon was characterized using FTIR to determine the functional groups that exist on both the raw material (Alhagi plant) and the active carbon nanoparticles (AACNPs). SEM-EDS was used to investigate the surface shape and the elements that compose the nanopowder. Particle size analysis was used to measure the size of the prepared particles. The mean diameter of the prepared particles was found to be 59.7 nm. The specific surface area of the powder was measured by BET. Central Composite Design (CCD) was used to determine the best preparation conditions and to understand the relationship between the studied parameters and the response (yield of nanopowder). Five different concentrations of sodium acetate and mineral oil were added to the nanopowder to make the expression stronger and show the hidden fingerprints. The results show that the best powder recipe was with 20.0%, 2.00% sodium acetate, and mineral oil, respectively. The Alhagi active carbon nanoparticles (AACNPs) powder was compared with the commonly used importer powder (Sirchie) and tested for several surfaces. The time for the latent fingerprint to remain on the surfaces was also diagnosed. The clear, visible fingerprint was noticed for 15 days.

**Keywords:** Nano Alhagi activated carbon; Fingerprint; sodium acetate; mineral oil.



## 17- Preparation and evaluation of CuO and CeO<sub>2</sub> as an economic nanoparticle catalyst (ENPCs) for the synthesis of glycerol carbonate from glycerol carbonylation with CO<sub>2</sub>

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### Abstract:

The synthesis of glycerol carbonates GC (C<sub>4</sub>H<sub>6</sub>O<sub>4</sub>) from the direct carbonylation of Glycerol GL (C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>) with Carbone Dioxide (CO<sub>2</sub>) is prepared and investigated experimentally. Firstly, the effect of two types of metal oxide as an economic nanoparticle catalyst (ENPCs) copper (II) oxide (CuO) and cerium oxide (CeO<sub>2</sub>) is studied in the production process of glycerol carbonate, which is prepared by the traditional precipitation (PT) method that lasted 5 hours at 400°C calcination temperature. Secondly, Reaction optimization study is carried out with CuO and CeO<sub>2</sub> as a catalyst by comparing the optimal performance of both catalysts in reaction conditions 150°C, 4MPa (≈40 bar) by using 2-pyridinecarbonitrile (C<sub>6</sub>H<sub>4</sub>N<sub>2</sub>) and dimethylformamide (DMF) (C<sub>3</sub>H<sub>7</sub>NO) as a dehydrating agent and as solvent respectively. Catalytic activity is deficient for acidic catalysts, indicating a slow reaction rate. The findings uncover that the GL conversion (XGL), GC yield (YGC) and GC selectivity (SGC) over 0.7g CuO (cat/GL=19%) are 57.151%, 47.524%, and 83.156%, respectively and GC yield over 0.7 CeO<sub>2</sub> is 36.2185% or 35.076%, and the yield of GC could reach as high as 78.234% over 1.73g CeO<sub>2</sub>. In addition, the results show both catalysts are recyclable several times at least five times and could be easily regenerated by washing with methanol (MeOH) three times and water. Furthermore, the (ICP- MS) results assured that that the leaching of CuO and CeO<sub>2</sub> as (ENPCs) is below the detection limit.

**Keywords:** Carbonylation of Glycerol Glycerol carbonate CO<sub>2</sub>, economic nanoparticle catalyst, (ENPCs), CuO, CeO<sub>2</sub>





## 18-Gelatin/Plga Based Microspheres as a Delivery Platform for Chondrocytes

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### Abstract

Osteoarthritis (OA) is a joint disease that involves the degradation of cartilage tissues and the underlying bone structure. The three approaches that have been applied to fix damaged cartilage, such as autograft, allograft and total replacement surgery, show limitation due to develop morbidity of donor location, lack of cartilage tissue obtainability, prompt immune responses, invasiveness and loosening implant which may need further correction surgery. Tissue engineer provides a new strategy to repair and regenerate damaged tissue by incorporating them into 3D porous scaffold carriers followed by implanting them using an injectable device. Thus, Gelatin/PLGA microspheres have been developed as a porous scaffold for chondrocytes carrier. Double emulsion method is one of the popular and best methods used to formulate microspheres. Briefly, a gelatin solution which represent inner aqueous phase was emulsified in PLGA oil phase. Then resultant first emulsion was emulsified in external aqueous phase of PVA. The double emulsion was stirred to evaporate organic solvent and centrifuged to collect gelatin/PLGA microspheres. The mastersizer result showed a polydisperse particles with 50% and 90% of the resultant microspheres were below 0.718  $\mu\text{m}$  and 512.443  $\mu\text{m}$  in diameter size, respectively. SEM images reveal a spherical and porous microsphere with smooth surfaces. The average value of absolute zeta potential was 30.7+4.895. As a conclusion, gelatin/PLGA polymers were able to act synergistically and formulated 3D scaffold microspheres with the desirable size, porosity and mechanical strength.

**Keywords:** Osteoarthritis, microspheres, Double emulsion method.



## 19-Implementation of Full Adder using Gate Diffusion Input (GDI) Techniques for Power Reduction

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### Abstract

This study focuses on the simulation and comparison of different dynamic logic circuits, followed by the proposal design to reduce power consumption. Through our investigation, we observed a significant reduction in power consumption and lower delays by employing the proposed buffer design. Furthermore, explored the application of Gate Diffusion Input (GDI) techniques in the design of logic circuits. Specifically, used GDI techniques to design logic circuits such as AND, OR, XOR, and multiplexers. Our findings revealed that this technique allows for the design of logic circuits with a reduced number of transistors. In addition, addressed the design of a collector circuit using the GDI technique and presented a collector circuit implemented with this approach. Based on our analysis, we concluded that the proposed circuit exhibits considerably lower delay and power consumption compared to previous works. Overall, this study involves the simulation and comparison of various dynamic logic circuits, introduces a design for power reduction, explores the utilization of GDI techniques in logic circuit design, and presents a collector circuit using this technique. Our results demonstrate the superior performance of the proposed circuit in terms of reduced delay and power consumption when compared to existing approaches.

**Keywords:** Authors should provide 3 to 5 keywords related to the subject of manuscript.

## 20-Applications of nanomaterials in dyes

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### Abstract:

Zinc, nickel, and silver oxides were prepared in a colloidal form by pulsed laser ablation using Nd-YAG 1064 nm laser at various preparation energies (500, 600 and 1000 mJ), and various number of pulses (25, 50 and 75). The starting materials utilized to prepare the oxides were immersed in liquids (water and ethanol). The laser frequency was fixed at 1 hertz, while the liquid temperature was maintained at 25°C. The preparation was carried out in two methods; the first method is placing a single slice of zinc, nickel, or silver in a preparation container filled with liquid, whereas the second is placing a slice of nickel together with a slice of silver in a horizontal position, then exposing the two slices to the laser. The synthesized nanomaterials were examined by a number of assays, including UV-Vis spectrometer, X-ray diffraction, Field scanning electron microscopy (FESEM), atomic force microscopy (AFM), contact angle and biological activity for two types of gram-negative bacteria (*Pseudomonas*) and gram-positive (*S. Aurous*) and one type of fungi (*Candida*). The biological results showed that ZnO prepared in distilled water was better than the one prepared with ethanol in suppressing bacteria and fungi growth. Contact angle and washability test show that the coating samples stand 750 blow brush in washability instrument with a mixture of nanoparticles. The Iraqi standard bearing the number 985 for the same local paint bear 500 blow brushes. (15).The starting materials utilized to prepare the oxides were.

**Keywords:** pulsed laser removal, local dye, nano- oxide, washability.



## **21-Green synthesis of Copper – Iron nanoparticles by Iraqi propolis to removal cadmium in drinking water.**

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### **Abstract**

Cadmium (II) is considered one of the toxic elements that affect the general health of humans, animals and plants. It is used in many different industries. It is important to remove cadmium from contaminated water. This study aims to biosynthesis of iron and silver nanoparticles by using Iraqi propolis as a reducing material to manufacture iron oxide and nano copper in an environmentally friendly and non-toxic way. In this study, iron and silver nanoparticles were bio-synthesized and the crystal size was measured by Ultraviolet and infrared (FTIR) spectroscopy and XRD Study of the properties of nanoparticles using a scanning electron microscope (SEM) it has an irregular spherical shape which indicates a new chain structure, The crystal size was 70 nano, and studying the ability of these nanoparticles to remove cadmium from polluted water, It was noted the highest removal rate at pH 4 compared with another pH treated, the detection of removal efficiency was better in the acidic medium than alkaline medium and the more nanoparticles increased, the greater the removal efficiency of cadmium, the Conclusion of this study we conclude that the biosynthesis of iron and nano-copper showed positive results in the removal of cadmium and it is considered non-toxic and environmentally friendly and that the removal of metal ion depends on the concentration of the metal, reaction time, pH and agitation speed.

**Keywords:** Green Synthesis, Fe – Cu Nanoparticles and Cadmium.



## 22-Preparation of Nano zirconium metal-organic framework (MOFs), and used as a drug carriers

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### Abstract

This research aims to new Metal-organic frameworks (MOFs) that are an interesting class of the hybrid materials that were built by assembling metal centers with organic linkers. Our MOFs were synthesized from the solution under solvothermal conditions. The typical solvents for the synthesis procedure were water, ethanol, methanol, dimethylformamide (DMF), and acetonitrile. In this study, adsorption, and desorption of Rifampicin medicine in the two types of Zr-MOFs, as well as the structural effects and kinetic aspects, have been investigated. The absorption and desorption process of Rifampicin molecules were investigated as a guest in three-dimensional (3D) porous coordination polymers. Two highly stable MOFs (UiO-66-vac and UiO-66-NH<sub>2</sub>) have been precisely chosen and compared their structural features, to achieve more effective capture and storage of Rifampicin. Moreover, each of these MOFs were characterized and exposed to Rifampicin solution to study the absorption and release properties of these two MOFs. Results showed high efficacy for the UiO-66-vac compound as it absorbed 7.55 ppm of Remfusin at 18 hours whilst the UiO-66-NH<sub>2</sub> absorbed 30.36 ppm at the same duration.

**Keywords:** Metal-organic framework, Absorption and desorption, Rifampicin, Thymol.



## 23-Designing a Novel Model for Estimation Transfer Function of Robotic Arm Actuator Using FPGA Nano Technology

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### Abstract

The actuator has been long recognized as a key component of the whole system of robotic arm. Similarly, the understanding of the robotic joint behaviour might provide complementary insights to designing high-performance controller systems. To achieve this issue, the Data Acquisition Circuitry (DAQ) system should estimate the transfer function accurately. This research focuses on designing a novel model High-Speed DAQC (HSADAQ) system, using Xilinx tools, Simscape Multibody, and FPGA Nanotechnology. Experimentally, the proposed design was tested with three different kinds of actuators. Based on the results, the best fit between the response of the transfer function and the collected data improved by 96 %. The comparison between simulation experimental results shows a very low deviation in terms of response time specification and average error for actuators 1,2,3 by 6%,9%, and 5% respectively, providing a high-efficiency circuitry to estimate precisely transfer function for any sort of robotic actuator, overcoming traditional DAQC systems.

**Keywords:** FPGA; Robotic Controller; Actuator, Xilinx, Estimation.

## 24-The use of nano calcium carbonate to improve the specifications of coatings

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### Abstract

The research aims to determine the extent of the effects that nanomaterials have on the specifications of alkyd paint in terms of viscosity, particle size, adhesion strength, and hardness. Nanocalcium carbonate was used, which the examination showed to have a size of 30 nanometers. A traditional alkyd paint mixture was used to make the models, and a reference model (A) was made using non-nano calcium carbonate, in addition to a test model (B) using nano-calcium carbonate. The percentage of nanomaterial was determined by examining the coating efficiency and was about 16% of the amount of non-nano calcium carbonate. The viscosity of the paint was 40 Poise for the reference model (A) and 41 Poise for the test model (B). The result of measuring the size of particles for the reference model (A) was 18 microns compared to the test model (B), which was 2 microns. Due to the extreme softness of the nanoparticles and their good mixing, the models were then placed in a weather accelerator for the purpose of examining the effect of weather conditions on both the hardness and adhesion strength of the paint. The results showed that the reference model (A) had a hardness of 75 and 87 for the test model (B), and the result increased after the weathering process to 87 for the reference model (A) and 93 for the test model (B). Examination of the adhesive strength showed that the reference model (A) had an adhesive strength of 101 Mpa and 129 Mpa for the test model (B). The adhesive strength decreased to 48 Mpa for the reference model (A) and 102 Mpa for the test model (B). Due to the effect of ultraviolet rays on the bonding material, From the results, it is clear that the use of nano-calcium carbonate enhances both the hardness of the paint and the paint's resistance to weather conditions.

**Keywords:** Alkyd paint, Nano Calcium Carbonate, Weathering, Hardness, Adhesive Strength.



## 25-Design and Selection of Rubber Compounds for Tread of Sukhoi Attack Aircraft Tyres by Using Nano Zinc Oxide

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### Abstract:

The research main idea is to design rubber compounds that can be used in the aircraft (Sukhoi-Su-25) tires. This kind of aircraft tyres is demanded by the Iraqi Ministry of Defense. Previously, it were regularly and successfully made by the General Company for Rubber Industries to be used for Iraqi aircrafts. The rubber compound of the tread part consists of: pure natural rubber the Conventional Zinc Oxide is used by adding (5) pphr. Olic Asid is added to the Nano ZnO, which is prepared in the labs, in order to prevent the agglomeration that change the size of Nano material into Micro material. Then, by adding (0.2, 0.5, 0.9, 1.5) phr of nano ZnO as an activators instead of conventional Zinc Oxide. After that, a number of tests are done to check out the specifications of The results were as follows: As for Cure time ,rate, and scorch time, the best results for the compound, we can see the overpass of the compound that contains 0.9 of Nano ZnO than the compound that has conventional ZnO by %32,56. For tensile test it overpass with (16%) In hardness test, we notice that it overpass with 5.37% and it resists for more than 500000 circles at 100°C. As for the cracking extension fatigue, the 0.9 Nano ZnO compound resiststance increases to 89.464%, The mechanical wear resistance overpasses on the with %88.88 Thermal aged is checked The decrease rate of it is %10.5 Whereas it is %73.911 in comparison to the traditional compound.

**Keywords:** Sol–gel method, Nanostructured zinc oxide, Cure activator, Mechanical properties, Thermal stability.

## 26-Synthesis and characterization of nanolaminate of honey wax and its Use in Prolonging Shelf Life of some fruits and vegetables

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### Abstract

Nanomaterial's play an important role in food preservation due to their unique properties in developing their ability to increase their physical properties as well as packaging materials. This study included preparation of nanolaminate of honey wax. The different method were characterized nanomaterial. The FTIR and Water dispensability of particles of the nano wax shows the stretching vibration of different group of compounds between wax samples and prepared nano wax. On the other hand the hydrophobic and hydrophilic groups were transported. From the spectroscopic analysis results, appeared clarity to formation the nanoparticles from beeswax. The SEM images showed that particles are spherical in shape, this corresponding with AFM analysis that showed particles are spherical in shape, single or in aggregates. The energy of the reaction is determined by the atomic number of the element in which it occurs, according to the EDX test results. It simply refers to the sample's initial composition (Cl, Na, C, O) at varying percentages in the nano wax sample. When compared to the wax sample and control (untreated bacteria) and fungi (*A. niger*), the inhibitory activities of produced bee wax nanoparticles against two positive and negative gram bacteria (*Pseudomonas aeruginosa*, *Staphylococcus aureus*) showed high activity (*in vitro*). The results showed that honey wax nanolaminate decreased *A. niger* growth when compared to other treatments. As a result, honey wax nanolaminate is an excellent bioresource/ biomaterial for the production of antimicrobial nanoparticles. Since there has been no mention of nanotechnology having any negative consequences to yet and that it can be used efficiently in the food business, Which emphasized the concept in a broad sense, which emphasized the concept in a broader sense, as well as the desire for nanotechnology in the packaging industry to increase product shelf life, as well as the safety and quality data of food products.

**Keywords:** Synthesis, nanolaminate, wax, Prolonging, food.



## 27- Large Scale Area of Low Temperature CVD – Grown Graphene

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### Abstract

Large area multilayers of chemical vapor deposition (CVD) graphene were obtained on copper (Cu) foil catalyst. Our CVD-graphene approach created continuous layers with sizes measured in square centimeters at 600°C temperature growth. The optical transmission and sheet resistance were measured for all films. Furthermore, the graphene layer uniformity with overall morphology was analyzed via atomic force microscopy (AFM) over areas of several square micrometers. There was a high amount of grain boundaries and defects in the large area graphene. For more clarity, the quality of graphene layers was identified through Raman spectroscopy. The G/2D intensity ratio in this spectrum was 2.97, which is around ~31 number of graphene layers (n GL) with full width at half maximum (FWHM) (25.12 cm<sup>-1</sup>, 81.98 cm<sup>-1</sup>) for G and 2D, respectively. Raman mapping was utilized to provide details on regions of graphene film up to 100 μm<sup>2</sup> in area. Our focused graphene transmission was directly influenced by the number of layers. It was reduced as the film thickness increases. In characterization target, there was a best figure merit around 0.045 for a sheet resistance of ~ 980 Ω/□. This is considered as each monolayer of graphene reducing film transmission in the visible range by 3 %.

**Keywords:** Graphene, CVD, Large area CVD-Graphene, Low temperature graphene.



## 28-Preparation and evaluation of efficacy of a vegetable disinfectant nano as antibacterial

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### Abstract

This study demonstrated an antiseptic and disinfectant effect similar to of dettol with the exception of the active substance used (chlorosylenol), which was replaced by silver nanoparticles prepared by the green chemistry method using turmeric extract as a reducing and stabilizing agent against the bacterial (positive or negative) of the Gram stain as well as for some fungi by the diffusion method. . The results showed that the nanopartical disinfectant and sterilizer with concentrations (0,1-0,05-0,025-0,01-0,006%) are very effective against the different strains of bacteria that are negative and positive for the stain Gram. and the fungus (*C.albicans*) and gives a killing rate ranging between (99.99 – 100)% Experiments have shown that the plant disinfectant has a high efficiency compared to the dettol disinfectant concentration (2.5%) and the iozan disinfectant (0.5, 1, 1.3, 2, 4)%. Silver nanocomposite was diagnosed using infrared (FTIR) and UV, (TEM)and XRD.

**Keywords:** silver nanoparticles, antimicrobial, curcumin powder, TEM, XRD



## 29-Preparation and evaluation of the efficacy of a plant-based nano-disinfectant from the waste of pressing flaxseed as an antimicrobial

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### Abstract

This study demonstrated an antiseptic and disinfectant effect similar to that of dettol with the exception of the active substance used (chlorosylenol) and pine oil, which was replaced by silver nanoparticles prepared by the green chemistry method using flaxseed residue as a reducing and stabilizing agent against the bacterial (positive or negative) of the Gram stain as well as for some fungi by the diffusion method. . The results showed that the nanoparticle disinfectant and sterilizer with concentrations (0.05- 0.025. – 0.0125. – 0.0062- 0.0031.)% are very effective against the different strains of bacteria that are negative and positive for the stain *Staphylococcus aureus* *Streptococcus mutans*) and the fungus (*C.albicans*), and the fungus (*C. albicans*) and gives a killing rate ranging between (99.99 – 100)% Experiments have shown that the plant disinfectant has a high efficiency compared to the dettol disinfectant concentration (2.5%) and the iozan disinfectant (0.5, 1, 1.3, 2, 4)%. Silver nanocomposite was diagnosed using infrared (FTIR), UV, (TEM) and XRD

**Keywords:** silver nanoparticles, antimicrobial, antiseptic and disinfectant, TEM, XRD



### 30-Developing the biological effectiveness of local dyes by adding nanomaterials and comparing them with international dyes for wet places

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#### Abstract

Nanomaterials play an important role in every field of our modern life, and the use of nanomaterials to develop the function or improve the properties of a specific material in research is very important. The research aims to develop a local dye and make it anti-bacterial and anti-fungal, especially for wet places, where a local dye (kenz) was used and a nanomaterial was added to it, namely nano-zinc and nano-titanium, and mixed well with the dye until homogeneous. Several models were made on iron strips measuring (5×10) cm and glass slides for the purpose of conducting tests on them, and several tests were conducted on them, including (XRD test, biological effectiveness, hardness test Shore B, adhesion test, brightness and whiteness test) as the tests showed a change in the properties of the local dye after adding the nanomaterial. The biological effectiveness increased when nanomaterials were added it new local paint showed the best results when adding the nanomaterial as an increase in biological activity was observed. The paint containing zinc and titanium particles showed activity, antibacterial against two types of bacteria (E-coli, ST), as the adhesion strength increased when the nanomaterial was added from 89 to 102, the hardness of the paint also increased from 85 to 94. An increase in whiteness, brightness and luster was also observed when the nanomaterial was added to the local dye, as it increased from 52 to 53. We conclude that the local coating improved after adding the nanomaterial to protect the surface components.

**Keywords:** Bacteria and fungi, Nano coating, Titanium, Wet places, Zinc oxide.

### 31- Practical Technique for Hollow Fiber Membrane Production

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#### Abstract

During hollow fiber (HF) membrane spinning process, the formation of an irregular structure could occur when different values of air gap, dope speed, and take-up speed were applied. In the commercial production of HF membranes, one of the most important issues is the production of HF membrane with a uniform wall thickness and a fully circular internal perimeter to prevent the reduction of the mechanical strength of the fibre. In this study, HF membranes were produced by dry/wet phase inversion technique. An attempt has been done to overcome the irregularity in the production of HF membrane by fixing the air gap residence time ( $R_t$ ). The effect of  $R_t$  on the inner contour stability of the HF membranes were presented. It was found that there is a strong relationship between air gap  $R_t$  and HF inner structure stability. The studied spinning conditions were air gap, dope speed and take-up speed. It was shown that when  $R_t$  increased due to an increase in air gap or a decrease in dope speed, the internal surface became stiffer because of the improved mass transfer rate between the bore fluid and the internal surface of the nascent fibre. Experimental observations confirmed that the inner contour formation was dependent on  $R_t$ . It was observed that the critical value of  $R_t$  for this dope solution was 0.67 s to produce a regular inner structure. The results showed that  $R_t$  is an important aspect for the design of successful spinning conditions and for the production of a stable HF membrane in commercial applications.

**Keywords:** Membrane; Hollow fiber; Residence time; Irregularity; Commercial production





### **32-Preparation and Addition (Nano TiO<sub>2</sub>) to bonding mortar (Iraqi cement)**

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#### **Abstract**

Titanium dioxide nanometer is a new, widely used material that scientists have recently focused on a lot because it is characterized by its small particle size and large surface area, and these two properties give it unusual and unique natural chemical properties. This material is characterized by high chemical stability and good heat resistance, and it is a non-toxic material, In this research, we have added Nano titanium dioxide gel (to develop its properties) to the bonding mortar at proportions of [10, 20, 30, 40] % as alternative to volume of water volume, with keeping the same ratio of [1 cement: 3 sand] with the "water to cement" proportion of (0.35). To study the structure, water absorption, density as well as mechanical properties. We performed Atomic Force Microscope (AFM), X-ray Diffraction (XRD), Infrared Screening (FT-IR), Scanning Electron Microscope (SEM), Density, Absorbance and Compressive Strength. The results showed that the crystal and structural structure was more compact and homogeneous as a result of the extension of the Nano-titanium dioxide gel as well as the saturation of the vacuums, which led to a clear improvement in the mechanical properties, so the best compressive strength was at 10% of the nanomaterial (35.840 MPa) after 56 days compared to the reference sample (25.600 MPa) and the absorption became zero at all ratios, while it was (3.44) in the reference sample.

**Keywords:** SEM, AFM, XRD, Cement mortar, Nano TiO<sub>2</sub>, compressive strength.

### 33-Preparation of a pharmaceutical formula from the aqueous nanoextraction of Lantana camara plant seeds in spray form to treat bacterial and fungal skin infections

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#### Abstract

The research involves the preparation of a pharmaceutical formula from the aqueous nanoextraction of the seeds of the shrub enamel plant and its use in the form of an external spray to treat infections caused by bacterial and fungal infections in the skin. Lantana camara is a plant species that has economic importance and can be promoted for various applications of its medicinal benefits as an antimicrobial, the nanomaterial was prepared from the seeds of the dendritic enamel plant and the use of its aqueous infusion after treatment with sonicator probe ,Where three layers of oil , gel and solution were formed, a diagnostic examination was carried out using an atomic force microscope (AFM), which clarified the surface shape of the nanoparticles, a scanning electron microscopy ( Sem ) examination was also carried out, where the exact shape of the nanoparticles and their diameter were clarified, the conformity of the vitamin K substance was also checked by a high-performance liquid chromatography separation device (HPLC) compared to the standard material and the results showed the conformity of the material with the standard material of vitamin K, The extract was employed through the preparation of a pharmaceutical formulation in the form of a spray according to the pharmaceutical specification, the biological effectiveness was checked to indicate its effect on bacteria and fungi(.E. Coli , Staphylococcus aureus and Candida albicans, where it showed an effective effect against them, a clinical examination was conducted on laboratory animals (mice) through an external wound in the back area and the response to treatment and treatment of inflammation was good as the wound was healed within a period of five days treatment.

**Keywords:** Lantana camara, skin infections, spray, antifungal antibacterial

### 34-Fabrication of nanocellulose membrane for food packaging applications

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#### Abstract

The preparation was carried out by converting cellulose from micro scale to Nanoscale using dry-spray technique Acid hydrolysis was performed with 64 wt.% sulfuric acid, five grams of cellulose was hydrolyzed with 50 mL of sulfuric acid at 45°C for 60 min) And we got the particle size (67.34nm) And then we mixed the cellulose with PVP at 80/20wt % at 80°C to 2 hours And we called it (PVP/nanocellulose ) Then afterward keeping those movies toward 25°C temperature to 2 hour. PVP/nanocellulose /MgO composites preparation by add magnusem oxide at (2, 4and 6)% for one hours until homogenous at 30°C moistness 50%) and cut into test. The contact angle, mechanical properties (Tensile Strength and Elongation) and antibacterial properties of the blend and composites were investigated. Contact angle show reduce in the result of the contact angle measurement proved that the composite are all hydrophilic with the PVP/NC/MgO composites being the least hydrophobic surface The Mechanical properties improved by Nano cellulose and Nano MgO and show increased in Tensile strength and Young Modulus . An antibacterial activity against Escherichiacoli and S. aurous show increased the inhibition zones surrounding the film square were formed, suggesting that nanocomposites offer good perspectives for food packaging applications which require an antibacterial effect constant over time.

**Keywords:** nanocellulose, magnesium oxide, contact angle, spray–drying.



## 35-Sensor-Rich Cities, Human-Centric Solutions: A Literature Review of Smart Cities in the Age of Big Data and Nanotechnology

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### Abstract

The 21st century's growing urbanization necessitates creative approaches to sustainability, resource management, and public welfare. Nanomaterials provide solutions for very sensitive, low power, and tiny sensors, opening the door for a dense, invisible network integrated into the city's structure. The convergence of big sensor data, nanotechnology, and smart cities has the potential to usher in a future where sensors become the silent guardians of citizen well-being, paving the way for livable, sustainable, and intelligent urban environments. This review of the literature investigates how large sensor data, nanotechnology, and smart cities are coming together to become a powerful force for urban change. We analyze how ubiquitous sensor networks might be used to collect real-time data on traffic, energy use, weather, and other important urban characteristics. With the use of sophisticated algorithms, big data analytics aims to extract useful insights from this flood of data, facilitating more intelligent decision-making for the urban change. Analytics aims to extract useful insights from this flood of data, facilitating more intelligent decision-making for proactive service delivery, optimal resource allocation, and effective infrastructure management.

**Keywords:** Sensor networks, massive sensor data, nanotechnology, intelligent infrastructure.



### 36-Improving Properties of the Silicon Solar Cell Using Glow Discharge Plasma

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#### Abstract

In this study, the effect of titanium dioxide (TiO<sub>2</sub>) coating on the efficiency of the silicon solar cell type p has been studied, where titanium dioxide (TiO<sub>2</sub>) has been deposited on the front surface of the silicon solar cell with a conversion efficiency of  $\eta = 10.13\%$  and area (5cm<sup>2</sup>) using plasma glow discharge DC, shed voltage difference on system poles (1800 V) and current (2.08 mA), and by pressure ( $2.4 \times 10^{-1}$  bar) using argon gas for (2 hr). Tests were performed (XRD, AFM), Optical tests (Transmittance, Absorbance, Reflectivity, Absorption coefficient, Energy gap) of the titanium dioxide layer (TiO<sub>2</sub>) deposited on the glass slide, and then a silicon solar cell examination was performed using a solar simulator before and after the plasma treatment, where a layer of titanium dioxide was deposited on the front surface of the cell with a thickness of (75nm), and after the deposition process was observed, there was an improvement in the efficiency of the solar cell where the efficiency increased from ( $\eta = 10.13\%$  to  $\eta = 11.56\%$ ).

**Keywords:** solar cell silicon, TiO<sub>2</sub>, deposition, plasma.



### **37-Using colloidal gold nanoparticles with monoclonal antibodies for prepare rapid test strips to diagnose KOI Herpes Virus in Carp Fish**

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#### **ABSTRACT:**

In this research, hydrogen tetrachlorourate (1%) (H (AuCl<sub>4</sub>)) was used to prepare a nano colloidal gold suspension, from which strips were prepared that are used laboratory and field to detect the infection of carp fish with the herpes virus. The preparation method is based on the immunochromatography technique, where single antibodies interact. The clone is labeled with gold particles with the virus antigen present in the test sample to form an immune complex, which is detected by the formation of a red line on the test strip. The examination was conducted on fifty samples of diagnosed negative and positive cases obtained from the veterinary hospital in Baghdad using prepared strips. 35 of the prepared strips showed a positive result with the positive samples, while 15 strips showed a negative result with the negative samples and no false positive or negative cases appeared, in addition to, it matches the time the result appears, which is 12-15 minutes.

**Keywords:** KHV diagnosis, KHV test stripes, Koi fish disease, Nano colloidal gold.



## 38-Enhancing HIV Antigen Detection Sensitivity: Evaluation of Nanoparticle-Based ELISA Diagnostic Kit

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### Abstract

In this research, we have evaluated the feasibility of using nanoparticle based assays for improving detection sensitivity of HIV antigen. A laboratory-used diagnostic kit was prepared to detect acquired immunodeficiency disease by the method of the enzyme immunoassay (ELISA). We prepared from reagents and buffer to be suitable for laboratory use. Tests were conducted on the prepared kit for (80) samples, including (40) samples for negative cases for healthy people and (40) samples for positive cases for people with the disease, where all blood samples were obtained from the blood bank. The tests showed conformity in the results compared to control kit used for this purpose and using the washing and reading devices available in the center's laboratories for the purpose of conducting qualitative control over the efficiency of the prepared kit. The value of the optic density of the negative control samples should be less than 0.5 using a wavelength of 450 nm. The samples were measured using an ELISA Reader device, and the rate was OD: 0.336 compared to the negative samples of the control kit, which was OD: 0.363. By fixing the method of preparation and obtaining identical results the center can produce pioneering meals and provide the beneficiaries (Ministry of Health and civil laboratories) of this type of diagnostic kit.

**Keywords:** HIV, AIDS, ELISA test, wavelength



### 39-Green synthesis of silver nanoparticles using alcoholic extract of *Acacia armata* L.leaves

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#### Abstract

This study came as a result of the significant interest in the green synthesis of metal nanoparticles (NPs) from plant extraction many fields. Silver NPs (AgNPs) were synthesized from *Acacia armata* L fresh leaves with ethanolic extract using the green synthesis method. The bioactive compounds in the plant were identified through GC-MASS, NPs were diagnosed using transmission electron microscopy (TEM). GC-MASS analysis cleared presence 25 bioactive phytochemical compounds in the alcoholic extract of *A. armata*. The highest concentration 44.251 % recorded in minute 24.052 were 9-Octadecenoic acid, Oleic acid and Heptaolecanoic acid compounds, while the species showed the lowest concentration was 0.440 % in 27.138 was of Vcceanic acid compound. The 9- Octadecenoic acid and Oleic acid were most present. Interestingly, oleic acid is fatty acid, In addition, in each extract solution was analyzed using UV-Vis spectroscopy with 350-600nm absorption peak. 5mM recorded highest absorption with 3.386 a.u. This was done to determine the characteristics of the peak spectrum of the Ag nanoparticle wavelength prepared for each different AgNO<sub>3</sub> concentrations (1mM–5mM). TEM analysis confirmed that AgNO<sub>3</sub> solution for 5m M concentration produced Ag nanoparticles and their average size was  $12 \pm 2.1$  nm. The data revealed deals mainly with the chemical profile of *Acassia* as well as the differences in concentrations of these compounds. moreover the plant-mediated synthesis of nano materials could be a basis for researchers to choose the plant part and focus on concentration to testing it on bacteria, fungi, or cancerous lines.

**Keywords:** *Acacia armata*, AgNPs, GC-MASS, Green synthesis, TEM.



## 40-A pharmaceutical formulation of nano sodium bentonite powder, 20% to get rid of aflatoxin toxins in Feed

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### Abstract

The best method was selected (bentonite preparation) depending on the availability of raw materials in the General Authority of Geological Survey local market. This research was conducted in several stages. In the first stage, scientific information was gathered and a formula was created; in the second stage, they were evaluated using various parameters such as pH, biological inhibition zone, stability study, and temperature effect. Several preparations of pharmaceutical formulas have been prepared until the final and stable formula is reached. Where the ingredient activity of efficiency ranged at room temperature from 106 to 108 % within the permissible limits, it used the biological analysis method for stability study. It was conducted under different temperatures (25, 30, and 40) at 65% of moisture for 3 months, after which samples of the preparation were sent to the Veterinary Directorate for clinical examination. It was used on poultry. The aim of the research is to investigate the function of sodium bentonite as a mycotoxin binder in animal feed and its consequences on animal production performance using bentonite. It appears to be effective as a toxin-binding addition that counteracts aflatoxin's negative effects. Aflatoxins are the most common source of contamination of food and feed around the world, accounting for nearly half of all known mycotoxins and prepare the bentonite formula when it comes to addressing aflatoxin toxins.

**Keywords:** Nano Sodium bentonite, adsorbents, feed additive, Aflatoxins, animal feeding, poultry.

## 41-Structural, Optical, and Electrical Characteristics of Titanium Dioxide Thin Films Prepared by Pulsed Laser Deposition

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### Abstract

In this research, the Pulsed Laser Deposition (PLD) technique was used, and the operating frequency of the laser was tuned to a double frequency. This was done in order to construct nano-thin films of titanium oxide (TiO<sub>2</sub>). An Nd-YAG laser with a wavelength of 1064 nm, pulse frequency of 6 Hz, and laser energy of 700, 800, and 900 mJ were used on glass and Si (p-type) substrates of different thicknesses. Then, the TiO<sub>2</sub> films were annealed for 2 hours at a temperature of 400 °C. UV-Vis spectra revealed that TiO<sub>2</sub> has strong UV absorption, as well as a large energy gap (2.9, 3.06, and 3.3) eV for energy levels (700, 800, and 900) mJ in contrast. In addition, FESEM analysis showed a granular morphology that showed a tendency for fragmentation into smaller particles with the growth of the thickness of the sample. The thickness of the thin films was determined using the FESEM cross-section, and the results showed that the thicknesses were 278.01, 1630.53, and 2579.66 nm for TiO<sub>2</sub> at laser energy of 700, 800, and 900 mJ, respectively. As the laser energy increased, the results showed an increase in the thickness of the thin film. In addition, the absorbance increased while the transmittance decreased with increasing thin film thickness. In terms of the electrical properties of the cell, we found that the efficiency of the annealed cell was significantly increased compared to that of the unannealed cell.

**Keywords:** Titanium Dioxide, Thin Films, Pulsed Laser Deposition, Optical Property.



## 42-Protective effects of Nano- herbal extract on sugar and lipid in diabetic mice

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### Abstract

In this study we proved the effect of Stevia and Nano-ginger extract as pellets food given daily on glycemic and lipidemic in albino mice with diabetic. According to results stevia and nano-ginger pellets have become effective tools for drug delivery to affected organ like liver for repairing and changing to the normal state which appear through decrease in blood glucose levels. In this work, we used different quantity (1,2,3) gm of pellet food with standard food given to mice daily for 1month with recorded of body weight daily to evaluate any changes in food intake. After 30 days of treatment the level of glucose, cholesterol, and tri-glycerides showed a significant reduce and return to basal levels and that associated with recovery in hepatic tissue compared to serous defect in diabetic group associated with histopathological finding. The major finding of the study was that the pellet food has a potent antidiabetic and nano-ginger can be considered as appropriated vehicle for stevia herbal to incense the continuous freeing of active antioxidant substances to treat of diabetes mellitus.

**Keyword:** stevia plant, Nano-ginger extract, lipid profile, diabetic mice.



### **43-Studying the effect of adding silica nanoparticles on the properties of polymer modified asphalt**

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#### **Abstract**

This study is aimed to improve the specifications of the improved polymer asphalt (PMB) produced in the state company for mining industries which is used in the road pavement, by rising the softness temperature, and decreasing the penetration rate and improving the stability of asphaltic mixture, by preventing the separation of the polymer ( SBS ) from the asphaltic bonding in the improved asphalt mixture (PMB ) during storage period and after servicing, due to the high temperature in Iraq which causes the rutting effect in the pavement, the Nano-silica sand was chosen to be added to the improved asphalt, the experiments performed with the use of nano-silica at different weighing conditions at certain temperature and good mixing conditions, which conducted good results to the improved asphalt and it was found the best percentage to be added was 6% which improved the asphalt to stiffness effect, and improving the rutting and fatigue effects.

**Keywords:** Asphalt, Nano silica, SBS.

#### 44-Veterinary Therapeutic and Prophylactic Nano Cream

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#### Abstract

In this research we observed the effect of Nano cream prepared as antibacterial and antifungal which contain Nystatin and Zinc oxide in Nano-form against gram positive and negative bacterial and fungi like (candida , Trichophytone sp.,and alternia sp.) considered as type of harmful fungi cause serous skin infection in human and animals . Through result we observed that the addition of activated material by nano process act as moisturizing agent in Nano- cream preparation, can significantly improve the efficacy of these creams. Furthermore, the use of functionalized nanoparticles in synergistic way has shown promising results in the field of Nano-medicine. Beside revolutionized in new skin therapies products can be used in human or animal through enhancing their effectiveness and longevity, improved stability and reduced irritation side effects. Beside development of Nano-delivery systems for topical creams and treatments is crucial in order to effectively transport compounds into the deeper layers of the skin while maintaining their biological properties. This allows for targeted delivery and enhanced efficacy of active ingredients, leading to more efficient treatment and prevention of skin conditions. The study show high effect on healing of skin burns of treated mice group with Nano-cream compared to other group not treated. Finally; our study shows that Nano-cream prepared has therapeutic potential benefits in the treatment and prevention of various skin conditions.

**Keyword:** Nystatin, zinc, antibacterial activity, Nano-cream.



## 45-Studying the electrical properties of a solar cell junction coated with nanomaterials consist of a gold, silver and copper using device LCR

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### Abstract

In this work, the combined voltage was calculated as a function of frequency in the reverse bias condition in the band,  $C^{-2}$  versus the bias voltage for the heterogeneous Si / B with gold, silver, and copper thermally deposited on the surface at the frequency (1MHz, 2MHz). This heterogeneous association is of the abrupt type. The capacitance CV measurement decreases with the increase in the bias voltage due to the increase in the depletion region width for all metals (Au, Ag, and Cu), the value of the combined voltage  $V_{bi}$  (0.59, 0.55, and 0.7) volts respectively for the frequency (1MHz). From the I-V characteristic before and after depositing nanoparticles on a bare Si solar cell for the (Au, Ag, and Cu) that effect based on nanoparticles leads to enhancement of the performance of the solar cells. The gold-deposited nanoparticles give the highest values of efficiency (21.79) for the other two cell samples, the results were relatively less. The increase of cell efficiency enhancement by effect on silicon solar cells has been studied.

**Keywords:** C-V measurement, Au, solar cell parameter, LCR meter.





## 46-Synthesis and Characterization of Magnesium Aluminum Oxide Nanoceramic via Soft Chemical Process

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### Abstract

In this research I have carried out synthesis and characterization of well-defined nanostructural framework of ultrapure monodispersible, colloidal bimetallic (Magnesium Aluminum Oxide) Nanoceramic by using molecular precursor via wet/soft chemical approach at moderate temperature that minimize economic, clean environment that can be used into fabrications of cost-effective sensitive devices, and nano sensors to give high reliability-reproducible result under ideal conditions. (MgAl<sub>2</sub>O<sub>4</sub>) Nanoceramic was synthesized by using (MgCl<sub>2</sub>.6H<sub>2</sub>O) with [Al(OH)<sub>3</sub>]. The structure, morphology and properties of the particle were characterized by FT-IR, XRD and SEM. The mean particle size (16.218 nm) was calculated by using X-ray diffraction pattern. A crystalline nature and with controlled particle distribution and phase purity was established with XRD and FT-IR. The crystallite size and phase purity increased with temperature which depends on the molar ratio of the starting molecular precursor, pH, temperature, reaction time along with its synthesis methodology.

**Keywords:** Sol–Gel, Nanoceramic Synthesis, Characterization Techniques, Soft Chemical Approach.

#### **47-Application and studying silver nanoparticles as antidiabetic agent and the role of LED (light emitting diode) or laser at the range (395-450) nm on the activity of drugs**

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#### **Abstract**

Many researches were made on diabetes mellitus (DM) and many materials were tried to treat this disease. Silver nanoparticles (AgNPs) were used in many fields in medicine. They were used as antibiotic and antidiabetic. So, they were used in recent papers in treatment DM in vivo successfully. In this paper, AgNPs were synthesized in green method and used with male albino mice (20-40) g. LED and laser in the range (395-450) nm have wide applications in medicine. Hence, laser and LED at the range of (395-450) nm were used in this work for diabetic mice to know their effects on DM and the live of the mice. It was found that AgNPs in concentration 6 mg/kg reduced blood glucose level (BGL) to the normal values, in the concentration of 15mg/kg of AgNPs three fifths were treated from DM and two mice were died, in concentration of 15mg/kg of AgNPs and they were radiated by laser or LED at the range (395-450) nm deaths reduced to one and four fifths were treated, in concentration of 15 mg/kg in two doses and radiated all of them were treated, in the concentration of 30 mg/kg four mice were died and one was treated, in concentration of 30mg/kg and irradiation by laser or LED the deaths reduced to two mice and three were treated. Then, the best treatment for diabetes mellitus is 15 mg/kg radiated with laser or LED in two doses, and it is found that the role of laser or LED is reducing the number of deaths and made the drug more active.

**Keywords:** Alloxan, Diabetes mellitus, diabetic mouse, laser, Light Emitting Diode, silver nanoparticles.

## 48-Using Mixed of Nano Aluminum Oxides and Magnesium Nitrate Salt in close loop system to obtain the high Thermal Performance of a Hybrid Photovoltaic Thermal Energy System

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### Abstract

Sundry studies about PV/T systems were done by researchers, and the designs of these systems have been applied widely, Photovoltaic/thermal (PV/T) systems refer to the integration of photovoltaic and solar thermal technologies into one system, where thermal energy and useful electricity are produced. This proposal aims to design and manufacture a model of a direct hybrid PV/thermal flat plate collector that was built and tested in the city of Baghdad which is located at latitude 30. A new PV/T system that consists of a photovoltaic panel, flat plate solar collector, thermal storage tank, and working thermal fluid. This fluid consists of Nano Aluminum Oxide ( $Al_2O_3$ ) and Magnesium Nitrate ( $Mg(NO_3)_2$ ). The thermal analysis for this system has been done on the PV/T combined for different ratios of  $Al_2O_3$  and  $Mg(NO_3)_2$  of 0.5:1, 1:1, and 1:0.5 and are mixed respectively. The samples were tested using a differential scanning calorimeter (DSC). The results show that a ratio of 0.5:1 Gave good results for transferring the heat from the solar collector into the thermal storage tank. The specific heat of the mixture at a 1:1 ratio, the temperature recorded  $4.72 \times 10^{-3}$  joule, for a sample that has 0.5:1 Nanomaterial in comparison to other samples that recorded fewer values.

Keywords: Hybrid solar system, Nano-fluids, Molten salt, Flat plate solar collector.



## 49-Nano-lycopene Preparation from Tomato Waste and Its Use to Extending Local Cream Shelf Life

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### Abstract

This study aims to prepare nano-lycopene from tomato waste and check its physiochemical characteristics to reveal its efficiency in prolonging the shelf life of locally manufactured cream, which have a high percentage of fat that make it more susceptible to oxidation. Lycopene is extracted from local tomato waste powder using mixture of three solvent: acetone, hexane, and ethyl alcohol in a ratio of 1, 2, and 1. Lycopene is identified using a high-performance liquid chromatography (HPLC) device. Lycopene nanoparticles are manufactured from lycopene extract by grinding with Steel ball mill, and it characterized to determine their surface morphology using a scanning electron microscopy (SEM) device, and its dimensions reached 62 nm. Atomic force microscopy (AFM) is used to determine its dimensions and roughness, which amounted to 45.62 nm. The average crystalline size is calculated, and use it to Extending the shelf life of locally cream to more than 20 days at refrigerated storage  $(4 \pm 2) ^0$  C. The same concentration of lycopene extract was added to prolongation its shelf life to reach 10 days while the control sample is considered spoiled after 5 days. This was confirmed by the results of peroxide value and acid number during the storage period. Sensory evaluation of the samples agreed with the results of the chemical tests.

**Keywords:** nano-lycopene, antioxidants, tomato waste, manufactured cream.



## 50-Synthesis and Identification of zinc oxide nano hybrid compound with silver nanoparticle and proof of its effectiveness in inhibition of antibiotic

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### Abstract

Preparation of hybrids nanocompounds as silver nano particles AgNPs with zinc oxide nanoparticle (ZnO) nano hybrid compound. Ag as Ag NPs by reducing agent in glucose solutions. The produced AgNPs are included in zinc oxide surface. The compound characterizing by X-Ray Diffraction, FT Infar spectroscopy, AFM and UV-Visible spectrophotometric. The inhibitory effectiveness of the compounds against bacteria (*S. aureus*) was studied, and the results of the inhibition diameter of silver nitrate were about (0.5 mm), while the inhibition diameter of silver nanoparticles was (3 mm). While the zinc oxide nanocomposite had an inhibition diameter of (2 mm), while the inhibition diameter of the silver nanoparticles was (3 mm). The diameter of the hybrid nanocomposite was (5 mm). This study also suggests the possibility of using the extended inter layer space of the Ag NPs-ZnO nanohybrid proposes the successful encapsulation of Ag NPs with zinc oxide. The prepared Ag NPs-ZnO hybrid nanocompound could appropriate to use in future antimicrobial and anti-bacterial applications. These freshly silverNPs-ZnO might offer a artistic anti-microbial for clinical and environmental applications.

**Keywords:** SilverNPs, ZnO, silverNPs-ZnO, antibacterial.

## 51-Improving the Electrical and Optical Properties of a Photodetector Using Silver Nanoparticles Deposited on Porous Silicon

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### Abstract:

Optical detectors are increasingly being researched to improve their optical properties, which has become the focus of researchers in this field. In this work, a low-cost, high-sensitivity hybrid photodetector was fabricated in two stages: the first step was manufacturing the porous silicon (PSi) detector, and the second was synthesizing silver nanowires (AgNWs) using a modified polyol technique with NaCl and KBr. The (PSi/AgNWs) fabricated photodetector was then studied using AgNWs deposited on PSi. Using a 250 Watt/cm<sup>2</sup> tungsten lamp, the fabricated detector was measured in the dark and after illumination for spectral sensitivity, I-V characteristics, photocurrent gain, and correlated color temperature (CCT). According to FSEM results, AgNWs have a diameter of 50–80 nm and a length of 5–30 m. AgNWs formed in a highly pure phase were confirmed by UV-visible and energy-dispersive spectroscopy (EDX) data, which revealed the presence of Si (12.42%) and Ag (87.58%). In comparison to the PSi-based detector, the hybrid PSi/AgNWs detector exhibits approximately ten times higher sensitivity. As a result of coating PSi with AgNWs/PSi layers, PSi had the best photo-to-dark current ratio of 12.11. These results were compared with previous studies, demonstrating that AgNWs can be used in the manufacture of high-performance one-dimensional hybrid photodetectors with increased sensitivity and spectral-selective photodetection caused by local surface plasmon resonance.

**Keywords:** Porous Silicon, PSi, Silver Nanowire, AgNWs



## 52-Mechanical Behavior Characterization of Thermoplastic Elastomers Reinforced by Nanoparticles: Numerical and Experimental Study

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### Abstract

This study describes and simulates nanobeams with viscoelastic layers in various experimental and computational models subjected to tensile loading, wear, three-point bending, and rotating bending Fatigue. The 3D printing method was used to prepare all specimens with the help of a polymer extruder. Specimens with different volume fractions reinforced by various types of nanoparticles ( $Al_2O_3$ ,  $TiO_2$ , and MWNT) were designed and tested to investigate their mechanical characteristics. The finite element methods (FEM) were used to validate the experimental results of maximum bending load, midspan deflection, and fatigue resistance. Various parameters, including volume fraction index, loading type, stress ratio, and geometrical properties, have also been investigated extensively for their influence on mechanical performance. It was found that PEEK 30 % CF sample nanoparticles containing ( 3.5) %  $TiO_2$  produced the best results in wear resistance compared to other types of polymers used, while PLA samples showed good fatigue resistance at 2.5 % MWNT nano. Results were reasonably consistent between experimental and numerical methods, with a maximum discrepancy of 9%.

**Keywords:** Thermoplastic Elastomers, 3-D printing, Experimental tests, nanomaterials, FEM



### **53-Experimental Study of the effect of Al<sub>2</sub>O<sub>3</sub> Nanoparticles coating on the surface properties of the heat exchanger tube in the Kufa Cement Plant**

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#### **Abstract**

Corrosion in heat exchanger tubes in the Kufa Cement Plant was studied. Low carbon steel samples were coated with Al<sub>2</sub>O<sub>3</sub>NPs in three volume ratio 0.5%, 1% and 1.5 with one, two and three layers Heat treatments were carried out at 75°C inside the oven through coating process. The effect of adding Al<sub>2</sub>O<sub>3</sub>NPs of 40nm size with distilled water was observed. The results showed an increase in viscosity with an improvement ranging from (2.2 to 2.5 times) and an increase in thermal conductivity with an increase in the concentration of Al<sub>2</sub>O<sub>3</sub>NPs with an improvement ranging from (1.19 - 1.38 times). SEM images showed homogeneity in the distribution of spray layers for 1% coated samples. Some agglomerations were detected at 1.5%. The chemical corrosion test was done on samples at 0.5%, 1%, and 1.5% with different coating layers by immersing samples in corrosion medium and applying potential difference. The results showed that the corrosion rate decreases with increasing concentration of nanomaterials and the number of coating layers, where the highest corrosion rate for a single layer of 0.5% alumina was 0.86 mm per year, and the lowest corrosion rate for three layers with a single layer of 1.5% alumina was 0.057mm /year. Corrosion rate improvement factors ranged from (2 to 15 times) compared to 0.5% single layer of Al<sub>2</sub>O<sub>3</sub>NPs.

**Keywords:** coating, corrosion, Al<sub>2</sub>O<sub>3</sub> NPs, thermal conductivity, viscosity.



## 54-Examine the Effectiveness of Nanoceramics Coating on Enhancing Car Surface Performance Using Different Techniques

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### Abstract

Car body coatings have the capacity to provide a range of outcomes, including the preservation and enhancement of shine, the provision of water resistance for coated surfaces, the prevention of dirt accumulation, and the enhancement of vehicle cleaning and maintenance effectiveness. Consistent cleaning and maintenance practices are essential for ensuring the prolonged preservation of the vehicle's exterior. Nanoceramics are easily counterfeited, particularly those that are marketed online without installation. The duration of the stay of the fake nanoceramics may be a few months; the nanoceramics may be fake ceramics made of low-quality polymer materials. Therefore, this study conducted a comparative analysis of the application of a liquid nanomaterial and a spray nanomaterial as coatings for automotive paints. One and two layers of each coated type were used with hybrid layers. An experiment was conducted to evaluate the adhesive strength of the coating, as well as its resistance to temperature, and UV radiation. Microscopic examinations, represented by SEM, as well as the EDX test, were conducted on a two-layer liquid paint sample to determine the nanoparticle size of the material and the elements present. Finally wettability test. The results indicate that the two-layer model for liquid coating outperforms other models in terms of effectiveness.

**Keywords:** Coating, Car Painting, Adhesion, Ultraviolet Ray, Nanoceramics.



## 55-Effect of nano MgO on improving electrical conductivity of electrospun Styrofoam membranes

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### Abstract

Electrospun Styrofoam membranes were prepared from electronic and food packaging waste materials composed of Styrofoam via electrospinning technique. Polymeric Solution of 25 wt. % Styrofoam was prepared using an acidic mixture (DMF:THF at 70:30 volumetric ratio). Different percentages (0, 0.02, 0.04, 0.06, and 0.08) wt.% of MgO NPs were added to polymeric solution. Scanning electron microscope (SEM) results showed a clear reduction in average fiber diameters from (1.5-2)  $\mu\text{m}$  to (0.5-1)  $\mu\text{m}$  after addition of 0.04 wt. % MgO NPs. The reduction in fiber diameter, which means increasing the surface area of fibers, may be attributed to increasing the electrical conductivity of polymeric solution before electrospinning. Fourier transform infrared spectroscopy (FTIR) reveals no new peaks and no shifts in peaks positions. This result may be related to physical mixing between Styrofoam solution and MgO NPs with no chemical reaction. Thickness test results showed decreasing membrane thickness as MgO NPs wt. % increased. This is related to increasing the solution conductivity which create higher repulsion forces between the emerging fibers themselves and make the membrane formation harder and more difficult. Electrical conductivity of membranes increased four orders with MgO NPs addition which may be resulted from increasing the concentration of charge carriers.

**Keywords:** Charge carriers, Electrospinning, electrical conductivity, Styrofoam, Thickness test

## 56-Enhancing the antibacterial activity of Erythromycin with titanium oxide nanoparticles against pathogenic bacteria

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### Abstract

Many studies have been conducted to establish the effectiveness of nanoparticles prepared in different ways may show antibacterial efficacy compared antibacterial drug used clinically. in other ways , widespread using of chemical medications lead to failure of curing from many diseases owing to the virulent of bacterial to each agents , as well as adverse effects and excessive drug prices. Furthermore, the use of antibiotics in animal feed increased the buildup of antibiotics in food items, as well as the emergence of allergy illnesses and antibiotic resistance in humans and animals. In recent study, we used titanium oxide prepared using sol-gel method with Nano-particles sizes examined by AFM Microscope 35 nm. With number of active elements present in Nano fluid which playing important role through activating the Nano material in first steps .Secondly preparation of Nano-solution consisting of erythromycin and Nano-titanium in different concentration. The inhibitory effectiveness of Nano-solution prepared examined by agar diffusion method for 1%, 0.5% and 0.25% of Nano-diluent. Nano-fluid showed broad activity against bacteria, directly proportional with the increase in concentration, which even exceeded the activity of the antibiotic itself. finally; the study demonstrates the importance of using active agents like titanium oxide as Nano-form with erythromycin powder in synergistic process lead to enhancing the inhibitory efficiency and consider as economical alternative to other antibacterial drug present in local market especially creams used for treating of chronic skin infections without risking the development of resistant bacterial strains.

**Keywords:** Erythromycin, Nanoparticles, Titanium oxide.



## 57-Nanophotonic Structure for Realizing Plasmonic NOT Logic Gate Based on Dielectric-Metal-Dielectric Formation at 1.55 $\mu$ m

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### Abstract

While photonics offers a compelling way to overcome electronics' speed constraint, one of the main obstacles to adopting photonic integrated circuits which are thought to be a hurdle in the production of all-optical computers is shrinking the size of photonic devices. Plasmonic is a promising approach to bridge the gaps in photonics (diffraction limit owing to shrinking size) and electronics (huge bandwidth and ultra-high speed). In this research, an all-optical NOT logic gate has been proposed, designed, simulated, and implemented using nano-rings Dielectric-Metal-Dielectric (DMD) plasmonic waveguides. By employing the Finite Element Method (FEM), the structure of the suggested plasmonic NOT logic gate is constructed and computationally simulated by two dimensions (2-D) structure. To build the suggested structure, materials such as silver and dielectric were selected. The coupling theory and resonance principles were utilized to produce the intended plasmonic NOT logic gate's functionality. Five criteria are used to evaluate the performance of the proposed device: modulation depth, insertion loss, transmission, contrast ratio, and extension ratio. According to numerical calculations, the suggested plasmonic NOT logic gate can be realized at an operating wavelength of 1.55 $\mu$ m with a transmission threshold of 0.5. This device's characteristics included a maximum transmission rate of 70% when it was in the ON state, medium extension and contrast ratios, high modulation depth value, low insertion loss, and ultra-compact footprint 300 nm  $\times$  300 nm. This technology is essential to the development of all-optical computers as it will provide access to nanophotonic integrated circuits in the future.

**Keywords:** Nanophotonic, Plasmonic Logic Gate, Dielectric-Metal-Dielectric.



## 58-Studying the Effect of Nanoparticles on the Separation Process of Oil Emulsions

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### Abstract

The article discusses the current state of the separation of water-oil emulsions. Selection and manufacture of demulsifiers based on components of natural origin for the separation water-oil emulsions, metals in nanostructured form to increase the efficiency of natural minerals in the separation of water-oil emulsions. The presence of water in oil negatively affects the efficiency of oils. The practical importance of the work lies in the fact that the composition of the demulsifier based on components of natural origin, the thermodynamic parameters of the demulsification process, the modernization of the process flow diagram of the emulsion separation process, the hardware design of the emulsion separation process "water- oil". Metal nanoparticles are proposed as a modifier to increase the efficiency of the proposed demulsifier. The choice of metal nanoparticles providing the greatest degree of water extraction from the emulsion is offered from the following range: Mn, Cu, Cr, Ni. To study the separation of emulsions "water - crude oil" the effectiveness of their separation was determined using the proposed demulsifiers. The results demonstrated the effectiveness of using nanoparticles in efficiently separating oil emulsions.

**Keywords:** Water-oil emulsions, Demulsifiers, Oil, Water, Metals in nanostructured form.



## 59-Investigation Study of sound absorption performance of a Nano perforated panel

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### Abstract

Noise pollution is a primary risk that internationally reduces people's quality of life and the demand for comfortable environment in terms of the noise level is important in buildings such as classrooms, health care facilities, and auditoriums. The fast advancement of industrialization, urbanization, transportation networks, and technology has led to a significant increase in noise pollution in recent years. Therefore, it's important to protect our environment by using green materials. Perforated panel absorbers are one of these green materials and are recognized as that the next group of sound-absorbing materials. Most recently presented research performs the acoustic analysis of micro-perforated panels. A three-dimensional model of a single layer Nano perforated panel will be presented here. The main object of this study is to investigate the sound absorption performance of these panels using the finite elements method. The model has been built and analysed using COMSOL Multiphysics software. This work provided an overview of the sound absorption coefficient and discussed its influence using these nano-perforated panels.

**Keywords:** sound Absorption coefficient; Nano Perforated panel, Noise, Finite Element Method



## 60-A Comprehensive Analysis of the Corrosion Behaviour and Some Other Properties of Cpti after Coating with a Mixture of Chitosan and Hydroxyapatite Nano Particles

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### Abstract

Titanium and its alloys are commonly utilized metals in the fabrication of medical devices, like orthopedics and dental implants. However, this implant may be subjected to corrosion due to the surrounding environment that consists of blood and body fluids. It was prepared the circular commercially pure titanium (Cp-Ti) discs of 10 mm diameter and 2.5 mm thickness. Ti samples have been soaked in a mix of (HA/ Chitosan) with a stirrer at low speed for 90 min to precipitate the coating layer. Then, the samples were removed and dried in the air as the first layer of coating and then soaked again in the mixture for 15 min, and then removed and dried in a hot air oven (200 °C). The results of coated titanium samples showed different surface characteristics, with current, roughness associated with the appearance of a crystal pool, and irregular accumulation of small, spherical-like granules. The EDX analyses have shown the presence of ions, which comprised the HA. Through the OCP corrosion test and ANOVA test, it was found that there is a highly significant decrease in corrosion rate due to coating with hydroxyapatite and chitosan. Based on the results, it was concluded that the coating with HA and chitosan increases the Osseo-integration rate and decreases the corrosion rate of titanium implants.

**Keywords:** Commercial pure titanium, Dip coating, Chitosan, Dental implant, Corrosion.



## 61-Toxicity of polymeric nanocapsules prepared from *Moringa oleifera* leaf extract against the larvae of *Culex papiens* (Diptera: Culicidae)

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### Abstract:

The study aimed to prepare a Nano capsules formulation from the acetonic extract of *Moringa oleifera* leaves, using polymeric capsules, and test its toxicity against the third instar larvae of *Culex papiens* mosquitoes. The leaf extract was prepared using acetone as a solvent, and the Nano polymeric capsules were prepared using the synthetic polymer polyethylene glycol 4000. The results showed the successful preparation of Nano polymeric capsules from the leaf extract, with an average particle size of 259.2 nm, and a nanocapsules diameter of 263.83 nm, as determined by DLS and SEM analysis respectively. The toxicity results indicated that the Nano polymeric capsules of the leaf extract exhibited higher mortality rates, reaching 97.6% at a concentration of 1333 ppm, with a median lethal concentration (LC50) of 421.56 ppm. In comparison, the traditional leaf extract showed higher mortality rates of 100% at a concentration of 6125 ppm 72 hours of treatment, with a median lethal concentration (LC50) of 1719.67 ppm. These results demonstrate that the Nano polymeric capsules of the leaf extract are more efficient than the traditional extract, even at lower concentrations, and could serve as an environmentally-friendly and effective means of mosquito control.

**Keywords:** Toxicity, Nano capsules, plant extracts, *Moringa oleifera*, *Culex papiens*

## 62-The Impact of pH on the Properties of Hydrothermally Synthesized CeO<sub>2</sub> Nanoparticles

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### Abstract

In this study CeO<sub>2</sub> NPs were successfully prepared via the hydrothermal method. The prepared nano-sized particles were characterized using various techniques including: Ultraviolet Visible (UV–Vis) spectroscopy, X-ray diffraction (XRD), high-resolution Field Emission Scanning Electron Microscopy (FESEM), Energy-Dispersive X-ray spectroscopy (EDX). The influence of pH on the properties of prepared cerium oxide nanoparticles (CeO<sub>2</sub> NPs) was investigated. The (UV–Vis) spectra showed the absorption peak changing from 335 nm to 298 nm with increasing pH value from 7 to 11, indicating the occurrence of a blue shift, which is a prior indication of the decrease in the grain size of CeO<sub>2</sub> nanoparticles with increasing pH value. The XRD pattern of CeO<sub>2</sub> NPs reveals the fluorite cubic structure, the crystallite size changes with an increase in pH value. According to FETEM image analysis, the average CeO<sub>2</sub> particle size decreases from 35.85 to 20.65 nm with increasing pH value from 7 to 11, Energy-Dispersive X-ray analysis (EDX) was employed to confirm the chemical and elemental composition of the CeO<sub>2</sub> NPs compound.

**Keywords:** Cerium oxide nanoparticles, Hydrothermal synthesis, pH influence, Nanoparticle synthesis, Catalytic applications

### **63-Synergistic antimicrobial therapy using selenium metal- Nanoparticles and Gentamycin for the treatment of multidrug Resistant bacterial infection**

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#### **Abstract**

Many researches have been conducted to clarify the effectiveness of nanoparticles prepared in different ways, which have shown broad effectiveness against various bacteria compared to antibacterial drugs used clinically. On the other hand, the widespread using of chemical drugs has led to failure of treatments due to the virulence of bacteria, as well as side effects and high drug prices. Thus, allergic diseases and antibiotic resistance arise. In current study, we used selenium nanoparticles prepared by the sol-gel method where the sizes of the Nano-particles examined with an AFM Microscope 35 nm. With number of active elements present in Nano fluid which play an important role in activating the Nano material in first steps .Secondly prepare a Nano-solution consisting of Nano-selenium and gentamycin in several dilutions. The bacteria inhibitory activity of Nano-solution prepared by spreading on the agar diffusion method for 1%, 0.5% and 0.25% of Nano-diluent. Nano-fluid showed broad activity against bacteria, directly proportional to the increase in concentration, which even exceeded the activity of the antibiotic itself. finally ; the study demonstrates the importance of using active agents such as selenium in Nano-forms with gentamycin powder in synergistic process lead to increase the inhibitory efficiency and consider as economical alternative to other antibacterial drug available in local market especially creams used for treating of chronic skin infections and reduce the risk of drug resistant bacteria.

**Keywords:** Gentamycin, Nanoparticles, Selenium



## 64-Preparation and Study of the Effect of Ultrasound Exposure on the Properties of Graphene Oxide Nanosheets and their Antimicrobial Effectiveness

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### Abstract

This study aims to investigate the effect of exposure to ultrasound on the properties of Graphene Oxide nanosheets GO prepared from graphite oxidation (Gr) using modified Hummer's methods. The properties of GO nanosheets were studied by UV-vis spectroscopy, infrared Fourier diversion (FT-IR), X-ray diffraction (XRD), electronic microscopy of field emissions (FESEM), dispersion analysis of dispersed X-ray energy (EDX), thermal weighing analysis (TGA), as well as study of biological effectiveness. Results show that the level of oxidation increases when using ultrasound. However, it was found that increasing the exposure time of ultrasound may remove some functional oxygen groups. Due to the effects of the acoustic cavity and free radical generation that are primary oxidizing and reduction agents in contrast reduce the size of nanosheets by increasing time. Therefore, the exposure period for ultrasound should not exceed 15 minutes. Therefore, ultrasound is a common approach to peeling and reducing as well. Its antibacterial effects have been studied against Gram-positive and Gram-negative bacteria, and the results indicate a high inhibition rate with an increase in oxidation.

**Keywords:** Nanobiotechnology; nanosheets: sonochemistry; EDX analysis; biological method.

## 65-Influence of the Magnetic Field on the Structural and Morphological Properties of the Hydrothermal Growth of ZnO Nanostructure

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### Abstract

The effect of a permanent magnetic field (500 Gauss) on the hydrothermal preparation of zinc oxide (ZnO) nanostructures was studied. Using this approach, ZnO was deposited on various substrates, including insulator/glass, semiconductor/silicon, and conductor/FTO-glass. A horizontal substrate position without and with the magnetic field ( $B=0.0$  Gauss, and  $B=500$  Gauss) was investigated, respectively. The surface morphology and crystalline structure of the produced samples were characterized by scanning electron microscopy (SEM) and X-ray diffraction (XRD), respectively. The main finding of this work is to recognize the crystal structure parameters and the morphology enhancement by using magnetic fields.

**Keywords:** Magnetic field; ZnO nanostructure; Hydrothermal; XRD.



## 66-Theoretical Calculation of the Fill factor and Black Dye Efficiency on TiO<sub>2</sub> in a Model Dye-Sensitized Solar Cell

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### Abstract

In this research, a theoretical study is dedicated to calculating the fill factor and efficiency of model dye-sensitized solar cells (DSSCs) using TiO<sub>2</sub> and Black dye based on quantum theory. The current density is calculated for the Black dye-TiO<sub>2</sub> heterojunction system at the coupling parameters  $(0.1 \text{ to } 1.5) \times 10^{-2} \text{ (eV)}^2$  with Methanol (MeOH) solvent and electronic concentration  $(1.5 \text{ to } 3.5) \times 10^{24} \text{ m}^{-3}$  and reorganization energy 0.389 eV. The influence of the equivalent circuit J-V parameters,  $J_{sc}$ ,  $V_{oc}$  and fill factor on the efficiency of a dye-sensitized solar cell were studied and discussed. The J-V tests show that the optimized Black dye with TiO<sub>2</sub> electrode with electronic concentration  $3.5 \times 10^{24} \text{ m}^{-3}$  contributes to the increased improvement of the fill factor (F.F) and the power conversion efficiency (2.086). It was found that  $J_{sc}$  increases with fill factor and efficiency and concentration increase. The best efficiency of solar cell with the methanol of 2.086 % is achieved with the concentration of electron ( $3.5 \times 10^{24}$ ) in TiO<sub>2</sub> photoelectrode, which is over 68% higher than that of the concentration of electron ( $1.5 \times 10^{24}$ ) TiO<sub>2</sub> photoelectrodes.

**Keywords:** Fill factor, Black Dye, TiO<sub>2</sub> , Dye-Sensitized Solar Cell





## 67-Effect of nano clay on soil behavior

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### Abstract

Recent years have seen development of the use of nanotechnology in the field of building and construction in its various branches and application fields. This research work is based on the possibility of adding a nanoparticle or additive and the possibility of treatment and improvement of a part of the soil nanomaterials physiochemical and chemical, which gives acceptable results. The nanomaterials were made from the soil constituent material using the Ball Mill grinder for grinding and subjecting the crushed material to pressure several times and then grinding it using a special mill. These nanoparticles were added in different proportions of 0.5%, 1% and 1.5% to the original soil, and the basic experiments were, compaction testing, unconfined compression test and direct shear test, then comparison of results with the original soil. The results showed an improvement in these properties and the optimal ratio was 1.5%.

**Keywords:** nano, clay, soil



## 68-Using zinc oxide nanoparticles to reduce the effect of ultraviolet radiation on cotton textiles

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### Abstract:

Particles of ordinary zinc oxide and nano-zinc oxide were used to protect against the effect of ultraviolet rays on cotton textiles, and at a concentration (2%) of both ordinary zinc oxide and nano-zinc oxide, while using carboxymethylcellulose (cmc) as a binder and mordant for ordinary zinc oxide and nano-zinc oxide on cotton cloth at a concentration of 1g/100ml, at a temperature of (80-100) °C and a time of (5-10) minutes, and through practical experiments after immersing the cloth with the aforementioned materials, it was found that the sample treated with nano-zinc oxide worked to reduce the transmittance of harmful ultraviolet rays by reflecting the rays falling on the cloth to the concentration used compared to the sample of the cotton cloth treated with normal zinc oxide using a UV-Spectrophotometer device and at the wavelength (0-100) for reflectance, and the low transmittance of incident rays on the model treated with nano-zinc oxide.

Keywords: cotton cloth, nano zinc oxide, ultraviolet rays, the transmittance and the reflectance.

## 69-Evaluation of genotoxicity of Silver nanoparticles in Monocytic THP-1 cells using comet assay

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### Abstract

**Purpose:** Metallic nanoparticles (NPs) are promising nanomaterials used in various medical fields as well as in different technological solutions. Silver nanoparticles, "AgNPs" are widely used in diverse sectors such as medicine, food, cosmetics, textiles and electronics. But most of the previous toxicity studies on its genotoxicity are still limited. The current study aims to evaluate the genotoxicity of AgNPs on monocytic leukaemia cell line THP-1 (Tamm-Horsfall Protein 1) using comet assay and to study the recovery probability. **Methods:** It was conducted by using different concentrations of AgNPs (0.625, 1.25, 2.5, 5 and 10) mg/ml for diverse incubation periods. To assess cell viability using the dye exclusion test, Trepan Blue. Comet assay used to detect DNA damage in THP-1 cells by measure the percentage tail DNA before and after exposure to the AgNPs. **Results:** The findings show slight reduction in cell viability following the exposure to the Ag NPs of (0.625, 1.25) mg/ml, and significant reduction in cell viability following the exposure to the Ag NPs of (2.5, 5 and 10) mg/ml. While, the percentage tail DNA exhibit a considerable elevation in DNA damage for concentrations  $\geq 2.5$ ) mg/ml and for 24h incubation time. **Conclusion:** Taken together, by using the comet assay our study shows DNA strand breaks induce by Ag NPs. Increasing the concentrations of AgNPs can cause harmful genotoxic effects to the human body in a dose and time-dependent manner.

**Keywords:** Genotoxicity, silver nanoparticles, THP-1 cell line.

## 70-Laminated CNTs in Developing Transparent Electrodes for Semitransparent Solar Cells

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### Abstract

The surge in research focus on advancing semi-transparent solar cells (SSCs) using Carbon nanotubes (CNTs) has captured widespread attention and interest as they exhibit important mechanical and chemical properties that, through enhancing the fabrication of SSCs with, can increase the power-conversion efficiencies (PCEs). Hence, allowing SSCs to compete with the regular silicon solar cells that achieve substantially higher PCEs than SSCs. The lamination of CNTs was achieved by fabricating a network to serve as the top electrode for SSCs. In this network, freestanding Multi-wall CNT (f-CNT) was introduced using the conventional chemical vapor deposition (CVD). This method resulted in an improved utilization of CNTs, eliminating structural defects and enhancing manufacturing aspects. To further enhance efficiency in transporting positive charge carriers (holes) within the solar cell device, the CNT film required the incorporation of organic hole-transporting materials. Despite the generally lower PCEs of SSCs compared to regular silicon solar cells, the practicality and optimization of SSCs compensate for this deficiency. Thin film solar cells, such as SSCs, can achieve maximum efficiencies even when not at the optimal tilting angle, making them suitable for vertical installations in buildings. This highlights the excellent optoelectronic properties of CNTs, allowing a reduction in the Solar Heat Gain Coefficient (SHGC) within the desired area and introducing sustainable usage of abandoned carbon. The paper concludes by addressing challenges specific to addressing the problem of lower PCEs and introduces future perspectives, such as exploring the lifespan differences between regular silicon solar cells and SSCs. 1

**Keywords:** Carbon nanotubes (CNTs), Power-conversion efficiencies (PCEs), Semi-transparent solar cells (SSCs), Solar Heat Gain Coefficient (SHGC).



## 71-Impact of Nanomaterials in Oil Well Completion: A Comprehensive Overview

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### Abstract

Using nanomaterials in the oil and gas industry has emerged as a transformative approach to enhance various aspects of well-completion processes. This paper provides a comprehensive overview of the impact of nanomaterials in oil well completion, encompassing their influence on reservoir recovery, cementing, drilling fluids, corrosion resistance, fracturing operations, scale inhibition, and sensing technologies. Nanoparticles are crucial in improving reservoir recovery by modifying fluid properties and rock wettability and enhancing oil displacement and recovery rates. In cementing, nanomaterials contribute to stronger and more resilient wellbore structures, mitigating risks associated with wellbore failures, gas migration, and water ingress. Incorporating nanomaterials into drilling and completion fluids results in "smart fluids" with advanced thermal stability, rheological properties, and lubricity. This enhances drilling and completion performance while controlling fluid loss and reducing formation damage. Additionally, nanomaterials find application in corrosion-resistant coatings and additives, preserving the integrity of wellbore components over time. While the impact of nanomaterials in oil well completion is promising, challenges related to environmental and health considerations, as well as cost-effectiveness, must be addressed. Ongoing research endeavors aim to overcome these challenges, unlocking the full potential of nanomaterials and paving the way for their widespread adoption in the oil and gas industry.

**Keywords:** Nanomaterials, Oil well completion, Reservoir recovery, Wellbore cementing, drilling fluids



## 72-Nano-sized catalysts in organic synthesis: Efficiency and Toxicity

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### Abstract

Sustainable and economical chemistry is a serious challenge for researchers and producers in converting raw or waste into value accompanied with high rate. In research and industry: yield, green environment, selectivity, activity, stability, and possible regeneration of reaction component(s) are potential factors in choosing reaction conditions. In many chemical processes where reactants may need a catalyst. This metallic, non-metallic, complex, or organic catalyst can be defined as a specific material that improves the reaction progress without any self-transformation. Any catalyst has its effective surface area and energy in a stoichiometric balance forward more operative mechanism and applications. In organic synthesis, catalyst plays an important role in time and productivity as a major component in reaction matrix. Besides that, catalyst may order other reaction conditions in another direction. Organic reactions and nano-sized catalyst is an additional marker recently had been tested especially in multistep or one-pot methods. Nanomaterial and green chemistry is an old – new subject in making nanocatalyst, increasing selectivity, minimizing side products, and decreasing toxicity towards more significant results. Catalysis researchers studied significant nanostructured materials in oxidation - reduction, hydrogenation, elimination, polymerization, and more. They focused on catalyst morphology, magnetic, thermal, and other physical properties. Thereby, reviewing nanocatalyst in organic synthesis functionalizes our knowledge and opens a wide window for more understanding in this topic where area of nanocatalysis needs to be addressed for scale-up synthesis in design and development.

**Keywords:** Nanocatalyst, toxicity, organic reaction, green chemistry.

### 73-Synthesis and Characterization of Nanocomposites (Metal Oxides – Polyvinyl alcohol – Halloysite) By Hydrothermal Method and Anti-Bacterial Effect

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#### Abstract

In this study, controlled ratios of polyvinyl alcohol (PVA) matrix or halloysite nanotube (HNTs) matrix with metal oxides (MO), were investigated; PVA matrix may be greater than HNTs or vice versa, the (MO) used in this work were MO: CoO, NiO, CuO, and ZnO, a mixture of so-called nanocomposites was formed, as follows: (HNTs:PVA/ZnO:NiO, HNTs:PVA/CoO:CuO, HNTs:PVA/ZnO:CoO, HNTs:PVA/ZnO:CuO, HNTs:PVA/NiO:CoO, HNTs:PVA/NiO:CuO. Through this, one method of nanocomposites a synthesized by using hydrothermal method. The synthesized nanoparticles were diagnosed by the following techniques: Atomic force scanning (AFM), Field emission scanning electron microscopy- energy dispersive X-ray (FESEM-EDX), X-ray diffraction (XRD) with mapping distribution and Fourier transform infrared (FT-IR). As it was concluded through the results of these techniques that the halloysite were bound with polyvinyl alcohol by means of the hydrogen bonding or by means of oxygen - hydrogen to get ester bonds and this was proven by the shift that occurred in the peaks of the (FT-IR) 'as shown by these measurements. As for the XRD patterns were indicated the formation of synthesized nanostructures and from the diffraction peaks which referred to differed planes assigned the crystal (symmetry allowed) centrosymmetric. The characterization of HNTs–PVA composites and the use of crosslinked materials may lead to a better understanding of these novel composites and their potential uses in anti-bacterial. As for the use of these nanocomposite as antibodies against selected bacteria {*Escherichia coli* as gram negative and *staphylococcus aureus* as gram positive}, the showed a good response when used hydrothermal method (HNTs < PVA).

**Keywords:** Nanocomposites, Hydrothermal Synthesis, Antibacterial Properties.



## 74-Exploring Synthesizes Smart of Fe<sub>3</sub>O<sub>4</sub> –Polymeric Nano system by Co-Precipitation Method and Study its Application as Nanocarrier for Treatment of Fibrosarcoma Cell Line in BALB/c Mice

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### Abstract

Magnetite (Fe<sub>3</sub>O<sub>4</sub>) nanoparticles (NP) have been effectively synthesized using the co-precipitation method from Fe<sup>2+</sup>/Fe<sup>3+</sup> salt solutions as starting materials. This method is straightforward to use and yields fine, stoichiometric metal oxide particles, both of single- and multicomponent varieties. This study involved the preparation and optimization of NP sizes and forms during the synthesis process. In this experiment, the solution was magnetically agitated (at a speed of 700 rpm) at room temperature (RT) to produce a highly magnetic powder containing approximately 5 mg of Fe<sub>3</sub>O<sub>4</sub> NP. The structural properties of an as-prepared material were determined using an X-Ray Diffractometer (XRD). In this chemical process, Fe<sub>3</sub>O<sub>4</sub> crystallite sizes ranged from 20 to 70 nm, and after being coated with the polymers chitosan (Cs), polyethylene glycol (PEG), and folic acid (FA), together with the medication paclitaxel (PTX), to create nanoencapsulation Fe<sub>3</sub>O<sub>4</sub>@Cs-PEG-PTX-FA, they ranged from 100 to 130 nm. Magnetic properties were employed by vibrating sample magnetometer (VSM) to examine Fe<sub>3</sub>O<sub>4</sub> NPs. The result of the VSM measurement revealed that Fe<sub>3</sub>O<sub>4</sub> and Fe<sub>3</sub>O<sub>4</sub>@Cs-PEG-PTX-FA have saturation magnetization (Ms) at 59.6 emu/mg, and 19.9 emu/mg respectively. Statistical analysis, the data obtained were considered statistically significant with P <5%. The use of Fe<sub>3</sub>O<sub>4</sub> NPs in the biomedical industry is possible as drug delivery systems based on magnetic characterization.

**Keywords:** Fe<sub>3</sub>O<sub>4</sub> NPS, Fibrosarcoma, Chitosan, PTX, Co-precipitation, Nanocarrier.



## 75-Preparation of auto-cleanable cement using nano-additives

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### Abstract

The research dealt with adding nano-material titanium dioxide to ordinary Portland cement, as it is necessary to obtain a cement that has the ability to remove dust and suspended organic and chemical traces that arise from climate and environmental change. It also works to dismantle car exhaust to be an environmentally friendly cement. Test models with dimensions of  $7 \times 7 \times 7$  cm were cast after adding titanium dioxide in different proportions by weight of cement. Physical, mechanical and chemical tests were conducted in accordance with Specification No. 5 of 1984. Samples with dimensions of  $1.5 \times 1 \times 3$  were also cast after adding the nanomaterial in different percentages by weight of cement in order to expose them to normal sunlight to determine their ability to get rid of chemical and organic pollutants present on cement surfaces by activating the phenomenon of automatic cleaning and photocatalysis, where the percentage was 5 % is the best additive percentage that achieves automatic cleaning because it achieves the highest presence of nanoparticles on the surface, in addition to the fact that the added nanomaterial works to get rid of the toxic nitrous oxide associated with car exhausts, thus obtaining an environmentally friendly cement.

**Keywords:** nanomaterial, self-cleaning cement, environmentally.