

Research Title

Fluorescent Amphiphilic Carbon Dots Composite Nanofibre and Its Properties



Researcher's Name:	Dr. Tan Huey Ling
Contact Number:	014-2212616
Email Address:	hueyling@uitm.edu.my
Area of Expertise:	Nanotechnology
Grant Availability:	Yes
Vacancy:	MSc
Requirement	<ol style="list-style-type: none">1) Open to all Nationality2) MSc or BEng/BSc with CGPA > 2.80 (Education background in Chemical Engineering/Mechanical Engineering/ Applied Science or other related discipline)3) Interested in research and willing to learn new laboratory techniques4) Full time5) Allowance: RM 1500

Summary of the potential project:

Nanomaterials possess unique chemical and physical properties that make them desirable to use in many products. Amphiphilic carbon dots (ACDs), which are small carbon nanoparticles (less than 10 nm in size) with interesting optical properties. In this work, ACDs will be embedded in solid matrix and the key factors such as uniform dispersion of ACDs in the matrix and the interaction between CDs and polymer will be carried out.

Research Title

Fluorescent Carbon Dots Composite Nanofibre and Its Properties



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Researcher's Name:	Dr. Tan Huey Ling
Contact Number:	014-2212616
Email Address:	hueyling@uitm.edu.my
Area of Expertise:	Nanotechnology
Grant Availability:	Yes
Vacancy:	MSc/PhD
Requirement	<ol style="list-style-type: none">1) Open to all Nationality2) BEng/BSc with CGPA > 2.80, or Master in Science (Education background in Chemical Engineering/Mechanical Engineering/ Applied Science or other related discipline)3) Interested in research and willing to learn new laboratory techniques4) Full time5) Allowance: RM 1200 (Depends on the student's performance and attitude)

Summary of the potential project:

Nanomaterials possess unique chemical and physical properties that make them desirable to use in many products. Carbon dots (CDs), which are small carbon nanoparticles (less than 10 nm in size) is a new class of nanostructured materials that have recently attracted general interest for their unique properties of strong tunable photoluminescence, low cost, low toxicity and biocompatibility. These properties have led to a series of potential applications as in light emitting diodes, solar cells, sensing, catalysis, integration in photovoltaic devices etc. and more importantly to a possible breakthrough in biosensing, bioimaging and medical diagnosis.

Despite of their superior properties and versatility, CDs' luminescence properties might be reduced as a result of aggregation-caused quenching in solid state. This issue will be carefully investigated in this work by studying key factors such as uniform dispersion of ACDs in the matrix and the interaction between CDs and polymer.

Research Title

Green Synthesis of Multifunctional Carbon Dots from Agricultural Waste



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Researcher's Name:	Dr. Tan Huey Ling
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Email Address:	hueyling@uitm.edu.my
Area of Expertise:	Nanotechnology
Grant Availability:	Yes
Vacancy:	PhD
Requirement	<ol style="list-style-type: none">1) Open to all Nationality2) MSc or BEng/BSc with CGPA > 2.80 (Education background in Chemical Engineering/Mechanical Engineering/ Applied Science or other related discipline)3) Interested in research and willing to learn new laboratory techniques4) Full time5) Allowance: RM 1800

Summary of the potential project:

In this work, hydrothermal treatment of agricultural waste for preparing carbon dots (CDs) will be used. Optical and structural properties of the CDs will be studied by UV-visible and fluorescence spectroscopic, microscopic (transmission electron microscopy, scanning electron microscopy) and X-ray diffraction techniques. Surface functionality and composition of the CDs will be further characterised using elemental analysis and Fourier transform infrared spectroscopy (FTIR). Quenching of the fluorescence properties of the CDs can be utilised as a fluorescence probe for sensing and bioimaging purposes.

Research Title

Development of Metal–Organic Framework (MOF) Membrane-based Calorimetric Sensor for Detection of Toxic Metal Ions



Researcher's Name:	Dr. Nur Hidayati Othman
Contact Number:	011-23515139
Email Address:	nurhidayati0955@uitm.edu.my
Area of Expertise:	Membrane separation technology, Adsorption, Functional nanomaterials, Graphene-based materials
Grant Availability:	Yes
Vacancy:	MSc
Requirement	<ol style="list-style-type: none">1) Open to all Nationality2) Bachelor Degree3) Interested in research and willing to learn new laboratory techniques4) Full time5) Allowance: RM 1200- RM 1500

Summary of the potential project:

Heavy metals are typically detected and quantified using sophisticated analytical equipment. Many efforts have been made to develop portable heavy metals detection unit such as colorimetric sensor and optical sensor due to their naked-eye recognition nature. Pyridine and thiol are actively used as active probe molecules for the detector but it has limited sensitivity and low detection range (20-100 nM of metal ions concentrations) due to weak stimuli response. Thus, these materials can be functionalised with mesoporous materials to rapidly trap heavy metal. Functionalisation with metal organic framework (MOF) is expected to improve the sensitivity and detection rate of heavy metals due to uniform and large framework pore structure of MOF. Cheap polymeric membrane will be used as a substrate to support the active probe molecules. As the properties of membrane substrate and dip coating parameters play a significant role in producing thin and homogeneous deposition of active probe molecules layer, the effects both factors need investigated simultaneously.

Research Title

Development of nanophotothermal membrane for desalination



Researcher's Name:	Dr. Nur Hidayati Othman
Contact Number:	011-23515139
Email Address:	nurhidayati0955@uitm.edu.my
Area of Expertise:	Membrane separation technology, Adsorption, Functional nanomaterials, Graphene-based materials
Grant Availability:	No
Vacancy:	PhD
Requirement	<ol style="list-style-type: none">1) Open to all Nationality2) Bachelor Degree / Master3) Interested in research and willing to learn new laboratory techniques4) Full time

Summary of the potential project:

Currently, there is a crucial need to convert non-potable sources such as seawater or brackish water to suitable water for human consumption. Nevertheless, energy requirement to operate desalination plant accounts for half from its operating cost. Hence, low energy approaches such as membrane distillation has shown potential as it could operate at low operating temperature and pressure. In this research a nanohybrid photothermal membrane distillation system, where a localized photothermal heating induced by solar will be developed. The photothermal nanomaterials with multifunctional properties will first be synthesized before integrating the materials onto membranes via dip-coating technique. The performance of nanophotothermal membrane distillation will then be evaluated using bench-scale setup



Research Title

Emulsion Liquid Membrane for Wastewater Treatment

Researcher's Name:	Meor Muhammad Hafiz Shah Buddin
Contact Number:	017-3986316
Email Address:	meorhafiz7767@uitm.edu.my
Area of Expertise:	Membrane Technology
Grant Availability:	Yes
Vacancy:	MSc
Requirement	<ol style="list-style-type: none">1) Malaysian Only2) Degree in Chemical Engineering3) Able to work smart and independently4) Full time5) Allowance: RM 1300

Summary of the potential project:

Emulsion Liquid Membrane (ELM) is a double emulsion system where the primary emulsion consists of internal (water) and membrane (oil) phase. The primary emulsion is then dispersed in the external (water) phase to extract the targeted solute with the aid of carrier in the membrane phase. The research is intended to explore the utilization of ELM to remove contaminant from wastewater. Hypothetically, ELM able to serve as an excellent alternative for solute removal from aqueous solution due to its characteristics; high surface area to volume ratio, single unit of operation, fast extraction and low cost.

Research Title

Synthesize of Zirconia from Zircon Malaysia Sand

Researcher's Name:	Dr. Istikamah Subuki
Contact Number:	+603-55436537
Email Address:	istikamah@uitm.edu.my
Area of Expertise:	Injection Moulding, Hydroxyapatite, Composite, Synthesize of Zirconia
Grant Availability:	No
Vacancy:	MSc
Requirement	Full time

Summary of the potential project:

Synthesize monoclinic zirconia powder by caustic fusion method for dentistry application

Research Title

Advanced/Conventional Transesterification of plant oil from Elais Guineensis to biodiesel



Researcher's Name:	Amizon Azizan
Contact Number:	019-5167240
Email Address:	mijonmy@gmail.com
Area of Expertise:	Oxygen transfer rate in shake flask, Liquid distribution in shake flask, biofuel
Grant Availability:	No
Vacancy:	MSc
Requirement	1) Open to all Nationality 2) Fresh graduate is welcome 3) Full time/part time 4) In search of grant, otherwise, own start up

Summary of the potential project:

To use the palm potential due the abundance and future prospect for exports of biodiesel to the world market.

Research Title

Synergistic effect during microwave pyrolysis of food waste towards combustibility of biochar and bio-fuel using microwave pyrolysis technique.



Researcher's Name:	PM Dr Siti Shawalliah Idris
Contact Number:	012-3882579
Email Address:	shawal075@uitm.edu.my, shawal_idris@yahoo.com
Area of Expertise:	Waste to wealth, renewable energy
Grant Availability:	No
Vacancy:	PhD (Full Time)
Requirement	<ol style="list-style-type: none">1) Open to all Nationality2) MSc by research in relevant area. ** If student is interested in doing MSc, preferable obtained BEng in Chemical Engineering.3) Familiar with modelling and experimentation and instrumental analysis4) Equipment is readily available

Summary of the potential project:

This research work concerns about investigating the conversion of food waste to bio charcoal as fuel source. Microwave pyrolysis of food waste is complex process due to the dependency of the process over numerous parameters namely mass/volume input, composition, moisture content, temperature profile, dielectric properties, power level and products yield. The products obtained namely bio charcoal will be characterised and analysed for the combustibility analysis. The model of the microwave pyrolysis food waste is necessary in order to represent the physical system under various parameters, continuous and different operation conditions. It is expected the model developed will be able to predict the yield of products under various conditions and able to improve the nonuniform temperature profiles within food waste. An experimentation investigation of the above parameters and its modelling will be performed to determine the performance of bio charcoal produced as renewable energy source.

Research Title

CO₂ Capture, CO₂ Conversion and Reactive separation

Researcher's Name:	Dr Fauziah Marpani
Contact Number:	018-2013401
Email Address:	fauziah176@uitm.edu.my
Area of Expertise:	Biocatalytic membrane Enzyme technology
Grant Availability:	Yes
Vacancy:	MSc (Full Time)
Requirement	<ol style="list-style-type: none">1) Open to all Nationality2) BSc Chemical Engineering, with CGPA at least 2.853) Allowance: RM 1200- RM 1500 (depending on performance)4) Critical thinking, fluent english writing, honest, discipline5) Lab work will be conducted only maximum 8 months intensively, chances of graduating on time. Remuneration will be given based on quality of paper published.

Summary of the potential project:

Enzymatic catalysis in membrane in the application of CO₂ capture and direct conversion

Research Title

Mechanism of Clay Minerals Conductivity Diminution Using Hydroxide Solution

Researcher's Name:	Wan Zairani Wan bakar
Contact Number:	019-2636695
Email Address:	zairani@uitm.edu.my
Area of Expertise:	Petroleum Engineering/electrochemical
Grant Availability:	Yes
Vacancy:	MSc (Full Time)
Requirement	<ol style="list-style-type: none">1) Open to all Nationality2) Bsc or B.Eng with CGPA 3.0 and above in Petroleum Engineering/Chemical Engineering/Chemistry/Physics or related disciplines.3) Allowance: RM 15004) Good English command

Summary of the potential project:

Previous studies had reported that cation exchange capacity (CEC) of clay minerals (in powder form) can be reduced via hydroxide precipitation. The CEC is directly related to clay minerals conductivity. In this research we will investigate the mechanism of conductivity diminution on shaly sand plug (contain clay minerals) by means of CEC reduction using different hydroxide formulations.

Research Title

Mechanism of Clay Minerals Conductivity Diminution Using Hydroxide Solution



Researcher's Name: Dr Rozana Azrina Sazali

Contact Number: 011-21538586

Email Address: rozana592@uitm.edu.my

Area of Expertise: Flow Assurance and Oilfield Scale

Grant Availability: Yes

Vacancy: MSc (Full Time)

Requirement

- 1) Open to all Nationality
- 2) Bachelor Oil and Gas Engineering/Bachelor of Petroleum Engineering/
Bachelor of Chemical Engineering/Bachelor of Chemistry
- 3) Knowledge and experience in using various spectroscopic analytical equipment is an advantage

Summary of the potential project:

It is well known that silicate scale can be problematic in alkaline surfactant polymer flooding (ASP) due to high pH ASP slug propagating throughout the reservoir comingled with the low pH formation water. Research shows this silicate scale can be controlled via a down-hole continuous injection line of 250-500ppm scale inhibitor (SI) which is not considered economic. To date, various SI has been tested including terpolymer of acrylic acid, 2-acrylamido-2-methylpropane sulfonic acid (AA/AMPS) that proven can survive in a hostile environment normally encountered in typical EOR conditions and effective in mitigating this scale.

Hence, the minimum inhibitor concentration (MIC) that is considered economically practical will be determined by 'modifying' AA/AMPS polymer with carbon nanoparticles (CNPs) to enhance the squeeze treatment. In this project, CNPs is introduced to enhance the delivery of AA/AMPS placement and/or to assist in the "binding" of AA/AMPS to the rock surfaces.

The objectives of this research are 1. to determine the adsorption capacity (total amount adsorbed) of polymeric inhibitor, AA/AMPS onto CNPs; and 2. to determine the adsorption/desorption kinetics of AA/AMPS /CNPs blends in the rock formation.

The adsorption of AA/AMPS on the CNPs and the AA/AMPS /CNPs inhibition efficiency is studied via quantitative analysis using ICP-EOS and qualitatively through the characterization of silicate scale formed in the presence of AA/AMPS /CNPs blends (and its efficiency) using SEM, XRD, FTIR studies.

A good dispersion of CNPs in the chemical blend is expected will increase the adsorption of AA/AMPS on the rock surfaces due to the exposure of the higher surface area to AA/AMPS which consequently could mitigate the silicate scale deposition.

New developed AA/AMPS /CNPs to be deployed in squeeze treatment is a significant discovery in resolving the silicate scale problem in ASP fields in the most economical way i.e. much lower MIC and longer squeeze lifetime.

Research Title

Demulsification Mechanism Study of Water in Oil Emulsion using Biopolymer Nanocrystal



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Summary of the potential project:

Emulsion creates problems during oil production, transportation and treatment thus affect the operation costly. Toxicity and vulnerability of chemical demulsifiers gradually increase environmental and concerns. Hence, ethyl cellulose nanocrystal, a biodegradable polymer demulsifier had been proposed to reduce such problem. However, the study of this biopolymer nanocrystal to destabilize the water-oil emulsion is sparsely reported. Besides the conventional acid hydrolysis used to extract nanocellulose usually generates high acid waste water. Therefore, this research will focus on understanding the mechanism of ethyl-nanocellulose to improve water-oil demulsification mechanism in an environmentally friendly way. The objectives of this research are to synthesize and characterize ethyl-nanocellulose with ionic liquid of BmimCl, to evaluate the performance of ethyl-nanocellulose in the water-in-oil emulsion demulsification and to investigate adsorption mechanism of ethyl-nanocellulose for water-in-oil emulsion. The experiment will be commence with the synthesis ethyl-nanocellulose with ionic liquid BmimCl at different concentration, reaction temperature and time. The ethyl-nanocellulose obtained will be characterized for its morphology, physical, chemical and thermal properties for better understanding in method development. The optimum extraction of ethyl-nanocellulose results from ionic liquid will be evaluated for water-in-oil demulsification at different ethyl-nanocellulose concentration and emulsion water cut. The concentration of ethyl NC that give highest separation rate will be further evaluated on the adsorption mechanism in water-in-oil demulsification. The effect of surface morphology, wettability and adsorption process on liquid-liquid interactions will be attained. As output, this project will provide clear understanding on the adsorption mechanism of ethyl-nanocellulose toward water-in-oil emulsion. The impact of the knowledge will be beneficial in reducing toxicity and pollution throughout the oil transportation and demulsification process. The output is to support the idea of green technology and sustainability that become one of the Sustainable Growth Development for clean water sanctuary in oil and gas production process and National Nanotechnology Council of Malaysia.

Researcher's Name:	'Aqilah Dollah
Contact Number:	012-7624411
Email Address:	aqilah7097@uitm.edu.my
Area of Expertise:	Advanced Material, Production
Grant Availability:	Yes
Vacancy:	MSc (Full Time)
Requirement	<ol style="list-style-type: none">1) Malaysian Only2) Bachelor in Oil & Gas Engineering/Chemical Engineering/Chemistry or any related fields.3) Allowance: RM 18004) Able to work with & without supervision



Research Title

Supramolecular glycosides for energy conversion applications

Researcher's Name:	Nurul Fadhilah Kamalul Aripin
Contact Number:	016-3244833
Email Address:	fadhilah9413@uitm.edu.my
Area of Expertise:	Liquid crystal polymer
Grant Availability:	Yes
Vacancy:	PhD (Full Time)
Requirement	<ol style="list-style-type: none">1) Open to all nationality2) Master degree preferably in Chemistry3) Posses good organic synthesis skill and conduct good research ethics.

Summary of the potential project:

The project aims to prepare new electrolytes containing liquid crystal carbohydrates, LCCs and functional polymer capable to increase the efficiency of energy conversion devices and sensors. The purpose is to solve crossover phenomena faced by the existing electrolyte used in the direct methanol fuel cell which consequently reducing its performance. The proposed material is envisaged to provide alternative solution by preventing/reducing crossover via controlled morphologies with enhanced anisotropic conductivity.



Research Title

Investigation of liquid crystal block copolymers effect on proton transport phenomena of low temperature fuel cell membrane

Researcher's Name:	Nurul Fadhilah Kamalul Aripin
Contact Number:	016-3244833
Email Address:	fadhilah9413@uitm.edu.my
Area of Expertise:	Liquid crystal polymer
Grant Availability:	Yes
Vacancy:	MSc (Full Time)
Requirement	<ol style="list-style-type: none">1) Malaysian Only2) Bachelor degree3) Good laboratory skills and practice great research ethics

Summary of the potential project:

Low temperature fuel cells are a promising technology for renewable and environmental-friendly power source due to their noteworthy features including low operating temperature, high power density and easy scale-up. This research will be conducted by synthesizing liquid crystal (LC) block copolymers membranes using reversible addition-fragmentation chain transfer (RAFT) polymerization. It is expected that LC will control and improve the formation of the phase separated domain and thus enhance the proton transport phenomena in low temperature fuel cell membranes. The insights gained from this proposed work will contribute to a new and versatile concept of membrane preparation and new materials for low temperature membranes which has potential to be applied in renewable power source applications.

Research Title

Synthesis of unsupported mesoporous nickel-cobaltites for thermo-catalytic decomposition of biomethane



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Researcher's Name:	Nor Faeqah Idris
Contact Number:	0125631964
Email Address:	norfaeqah@salam.uitm.edu.my
Area of Expertise:	Chemical reaction
Grant Availability:	Yes
Vacancy:	GRA/MSc
Requirement	<ol style="list-style-type: none">1) Malaysian2) Degree in chemical engineering3) Full time4) Wage will be paid based on progress of research and student performance

Summary of the potential project:

Decomposition of biomethane is a new promising method to improve the nanocarbon yield. Heterogeneous unsupported mesoporous nickel-cobaltites will be investigated in this study via a facile coprecipitation method to alleviate high reaction temperature in biomethane decomposition. Nickel-cobaltites unsupported catalyst will be prepared using ammonium carbonate as a precipitating agent via co-precipitation method. The as-prepared nickel-cobaltites will be characterized by using X-Ray diffraction, energy dispersive X-ray spectroscopy, scanning and transmission electron microscopy, X-ray photoelectrospectroscopy, N_2 adsorption and temperature programmed reduction analysis.

Research Title

EOR locally developed chemicals, reservoir monitoring by radioactive tracers

Researcher's Name:	Dr Erfan Mohammadian
Contact Number:	0103652300
Email Address:	erfan@salam.uitm.edu.my
Area of Expertise:	Enhanced oil recovery, CO ₂ sequestration, bio-fuels, reservoir engineering
Grant Availability:	Yes
Vacancy:	MSc, PhD
Requirement	1) Allowance RM 1800- RM 2100 2) CGPA: 3.0 and above 3) Full time

Summary of the potential project:

Currently a project on chemical EOR, one on smart waterflooding, and one on application of tracers.

Research Title

Green Synthesis of Flexible Biopolymer Materials



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Researcher's Name:	Dr Ana Najwa Mustapa
Contact Number:	012-3678154
Email Address:	anajwa@uitm.edu.my
Area of Expertise:	Separation Processes, Materials and Environment
Grant Availability:	Yes
Vacancy:	MSc (Full time)
Requirement	<ol style="list-style-type: none">1) Open to all nationality2) Minimum CGPA > 2.753) Allowance: RM 15004) Interested and willing to learn new laboratory techniques, good ability to face challenges, creative, good interpersonal and communications skills.5) Willing to do Research Attachment in Universidad de Valladolid, Spain. Research materials, travelling cost and fee for attending conference and seminar will be sponsored.

Summary of the potential project:

Hydrogel is defined as three-dimensional network structures obtained from a class of synthetic and/or biopolymers. The gels are usually obtained by drying wet gels using freeze and ambient atmospheric drying. Nevertheless, these technique causes collapsed on most part of the pore volume. As consequences, the dried gels appear wrinkled-like, severely crack and possessing very poor surface area, porosity, light and visibility properties. These limitations may reduce process development efficiency, for example drugs loading and delivery, optical transparency and catalytic activity. A unique properties of CO₂ at supercritical condition i.e. high diffusivity, low viscosity and zero surface tension can be exploited as the most feasible drying technology to produce aerogels without damaging the original three-dimensional structure of the gels and improve their physical/chemical properties. In this study, a new hybrid biopolymer aerogels made of a hybridization of organic materials will be synthesized and dried by supercritical CO₂. The physical and chemical properties of the synthesized hybrid aerogels will be examined and compared to other ordinary methods i.e. freeze and ambient atmospheric drying. Investigation on the physical-chemical, textural and thermal properties of the new hybrid aerogels are significant in emerging new functional materials. In addition, study on the principle of new drying technology i.e. supercritical drying in production of biopolymer-based hybrid aerogels is foreseen could embark and motivate further application of the technology comprehensively in other fields such as food packaging, electronics, cleaning, catalyst, pharmaceuticals and biomedical.