Job Title: Postgraduate Student
Job Function: Research in Chemical Engineering
Employment type: Full time
Project Title: Elucidation of heat transfer effects of ultrasound on extraction and characterization of nanocrystalline cellulose

Job description:
The successful candidate is expected to conduct independent research in the following project:
Recently, due to industrialization and rapid growth in material consumption, the focus on renewable resources has become increasingly important. The unique advantages of cellulose, including strength, availability, and chemical functionality, is gaining interest as a source material. Recent research has begun to explore nano-sized cellulose with particular focus on the crystalline structure. Extraction of nano-crystalline cellulose (NCC) is conventionally carried-out through acid hydrolysis. Properties of NCC very much depend on the source of material and the extraction conditions, including temperature, type and amount of acid and reaction time. Acid concentration that is too high dissolves native cellulose, producing amorphous particles. Ultrasound, by producing and collapsing micro bubbles, generates high local heat and extreme agitation, which possibly reduces the reaction time and increases the yield of NCC. Nevertheless, the heat produced by ultra-sonication, along with the heat generated by the exothermic reaction of acid and water during the hydrolysis, could disturb the results. Therefore, an understanding on the heat transfer phenomena in this reaction is necessary to better control the process and properties of the product. This could be achieved through a series of experiments along with the use of fundamental heat transfer (both conduction and convection) equations to model the behavior. Such knowledge could allow the behaviour of this chemical breakdown to be controlled, subsequently improving the yield of NCC production, which is a much valuable material as compared to cellulose itself. A huge amount of ligno-cellulosic biowaste is available in Malaysia, and high industrial investment in this sector suggests NCC could be produced for use in other sectors. The main objective of this study is to explore the heat transfer behaviour of ultrasonic treatment in hydrolysis reaction during NCC extraction.
This project is Funded by FRGS grant from Ministry of Education (MOE) Malaysia. A competitive Monash scholarship might be awarded to successful candidates based on their academic achievements.

Desired Skills and Expertise
Applicants Must have a four-year Bachelor’s degree in Chemical, Mechanical, or Material Engineering from a reputable institution, with sound knowledge of heat transfer and analytical instrumentation, and proof of English proficiency (e.g., IELTS score of no less than 6.5 (overall) with band scores of no less than 6.0). The Candidate must be willing to relocate to Selangor, Malaysia.
The following are preferable:
Master's degree in the above mentioned fields
Malaysian citizenship
Experience conducting research with corresponding publications

Company Description:
As a full campus of the reputable Australian Monash University, we provide an international environment, emphasizing excellence in teaching and research. All Monash campuses, regardless of location, offer the same educational standards and accreditation. The Malaysian campus, located in Bandar Sunway, Selangor, is a dynamic community of staff and students that is supported by comprehensive first-class infrastructure, encouraging collegial processes intellectual achievement of the highest order.
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