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From first principles to nano devices fabrication

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This talk will be focusing on presenting an overall panorama regarding the combination of Physics, Chemistry, Biology, Computer Science and Applied Engineering to achieve Material Science fundamentals and its applications. The emphasis will be usage of computational code and software to determine fundamental characteristics (electronic structure) of semiconductor devices with special focus on energy materials. The talk will also present several cases of study for semiconductor (MoS_2), superconductor (Bi2212) and photovoltaic materials ($\text{TiO}_2/\text{Organic}$), which includes nanoparticles, nanotubes, thin films, superconducting tapes and sensors.

Biography

Manuel Ramos is a member and faculty advisor of the Materials Research Society (MRS-UTEP) chapter. He is also member of American Physics Society, Sociedad Mexicana de Materiales and Sociedad Mexicana de Catalysis, has authored and co-authored about 25 peer-reviewed manuscripts in the area of advanced nano-structured materials including nanoparticles, superconductors, catalysis and quantum computational modeling. His area of expertise includes High-Resolution Transmission Electron Microscopy and Computational Modeling using Density Functional Theory methods. He obtained a Bachelor in Experimental Physics from The University of Texas at El Paso in 2003, a Master's degree in Mechanical Engineering from Florida A&M University in 2006 and completed a doctoral degree in Material Science and Engineering at UTEP in 2010. He was appointed at National High Magnetic Field Laboratory, Sematech-Austin, UT-San Antonio and currently he is a Visiting Professor-Researcher at UTEP's Materials Research Institute.

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Biodiesel production using heterogeneous nano catalyst from waste cooking oil

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The demand for energy around the world is increasing; specifically the demand for petroleum fuels that is rapidly becoming scarcer and more expensive. The scientific community has been forced to investigate new type of renewable energy sources, mainly due to the greenhouse effect brought about by the growing usage of fossil energies and thus to increase the time over which fossil fuels will still be available. Biodiesel has become more attractive because of its environmental benefits and it is obtained from renewable resources. There is a growing interest in using waste cooking oil as the feedstock for biodiesel production due to its availability in Egypt. This study discusses the preparation of nano catalyst from saw dust by physical and chemical activation and their characterizations, also its application as a heterogeneous catalyst for biodiesel production from waste cooking oil by transesterification with methanol to give the corresponding mono alkyl esters. The effect of the following variables on the yield of the biodiesel produced was studied. The variables investigated were reaction time (0.5-2.5 h), catalyst concentration (3-10 wt%), temperature (27 "room temp."-60°C) and methanol: oil molar ratio (6:1-14:1). From the results obtained, it was found that, the chemical activation catalyst is more effective than physical activation catalyst that the best yield percentage was obtained using a methanol: oil molar ratio of 8:1, catalyst (5%) and $50 \pm 1^\circ\text{C}$ temperature for 1.5 h. The yield of biodiesel was determined according to GC-MS. From the results it was clear that the produced biodiesel fuel by the nano catalyst prepared in this work was in the recommended standards range of biodiesel fuel.

Biography

M Abdel Fattah got his BSc, MSc and PhD in Chemical Engineering from Faculty of Engineering, Alexandria University, Alexandria, Egypt. At present, he is working as an Assistant Professor at the Petrochemical Engineering Department-faculty of Engineering at Pharos University.

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