

SCIENTIFIC TRACKS & ABSTRACTS

Kinetic study of the transesterification reaction of African palm, rapeseed and sunflower oils for biodiesel production

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This paper aims to obtain apparent kinetics of the transesterification reaction of refined palm oil (*Elaeis Guineensis*) and a mixture of palm-sunflower and palm-rapeseed oils to produce biodiesel with methanol using a catalytic medium with homogeneous basic sodium hydroxide. Statistical analyzes were performed varying the concentrations of catalyst and methanol's molar ratios in the reaction and the yield obtained experimentally was measured for each one. The kinetic study of the reaction was performed with the best conditions found and experimentally measured concentrations of each component in the mixture at different times. The final product was analyzed for quality variables and compared with ASTM D6751 in order to ensure proper functioning of it in diesel engines. The results show that biodiesel produced through a mixture of palm oil and sunflower oil, requires less reaction time and that adding sunflower oil to the palm becomes kinetics faster as bigger is the concentration of saturated fatty acids in the mixture.

Keywords: Biodiesel, Kinetics, Simulation, Transesterification.

Hussein A.Z. AL-bonsrulah, J Chem Biol Pharm Chem 2020, Volume 03

Green energy Technologies & Solutions to reduce carbon emissions

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The recent climate change agreement in Paris highlights the imperative to aggressively decarbonize the energy economy and develop new technologies, especially for the generation of electrical energy that are environmentally clean. This challenge can only be addressed by a multi-pronged approach to research and education of the next generation of scientists and engineers as well as informed public discourse. This study deals with appropriate technological solutions to reduce carbon emissions by using green energy while maintaining the appropriate economic cost at the same time, the purpose of this study is to design a hybrid system consisting of PV/Diesel generator, where the two will work alternately in all climatic conditions to generate the required load This method is considered the best in the world of technology.

Keywords: Technology solutions; Hybrid system; Carbon emissions; Green energy; Sustainable energy; Economic analysis.

Dr. Redouan Boughaled, J Chem Biol Pharm Chem 2020, Volume 03

Nano-Engineering PVD Thin-Film Coating for Photocatalytic Efficiency with High Optical Performances

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Owing to rapid developments in the fields of nanotechnology, energy efficiency, and thin film technology, a more precise knowledge of the surface characteristics and the quality control after processing is a vital challenge. It has been an ambition of both researchers and industries for the past many years to produce self-cleaning surfaces that have a good optical quality and photocatalytic efficiency, particularly with regard to a broader application. It is anticipated that this research will help to realize this aspiration by optimizing coating technologies and materials as well as to introduce standardized methods for surface analysis and the correlated photocatalytic efficiency.

The primary focus of this work is to produce thin films using physical vapor deposition technologies (PVD), which involves the investigation of ion assisted deposition (IAD) and conventional thermal evaporation methods. The discharge current, voltage and gas flow were also varied in the ion-sources to ascertain the optimal parameters. TiO_2 films processed with IAD using the CC-105 plasma source exhibited the highest photodecomposition rate and super-hydrophilicity effect, with the samples as well demonstrating antimicrobial activity towards test microorganisms. The electron-beam vaporization techniques can produce, by selecting appropriate parameters such as substrate temperature or coating rate, dense layers that can effectively improve reproducibility of layer morphology.

As a result of these properties, PVD prepared TiO_2 films are a distinct candidate for use in different applications involving precision optics, such as in spectacles, window glass, laboratory equipment, for example scales, and many more.

Biography

Dr. Redouan Boughaled has completed his PhD from Leibniz University of Hanover, Germany. He developed industrial products and processes in Thin Film Technology at Laser Center of Hanover, Germany. On the last 15 years, he have managed numerous research and industrial projects in Coating Technology, Industrial Chemistry, and in Surface Analysis. He was nominated as an expert for the German Institute for Standardization (DIN) in Berlin, and he is certified quality manager from German Quality Management Association.

Zeena Cherian, J Chem Biol Pharm Chem 2020, Volume 03

Addressing Stain Resistance of Coatings by New Experimental and Modeling Techniques

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Today's discerning interior architectural coating consumers value paints that offer low odor, improved application and end use performance attributes such as flow and leveling, scrub and stain resistance etc. Stain resistance is the ability of the coating surface to withstand discoloration caused by contact with various type of stains. There is a concerted effort in the coating industry to develop interior water-based paints with improved stain resistance to hydrophilic and hydrophobic stains. Achieving stain-resistant properties for the paints require a combination of tailored polymer dispersions, balanced paint formulation ingredients and efficient use of rheology modifiers. This study describes new techniques such as molecular modeling (which looks at interactions between key components in paint such as binders, rheology modifiers etc), Atomic Force Microscopy (AFM-which looks at the paint surface to decipher the distribution of various components such as thickener and stain molecules) and Quartz-Crystal Microbalance (QCM- which looks real time at the adsorption and desorption process of stains on paint surfaces) have been developed to get a better understanding regarding the major contributing factors that cause staining. The objective of the study is to understand the overall mechanism of stain formation and removal that should help in designing, formulating and fine-tuning improved stain-resistant coatings.

Biography

Zeena Cherian is a senior staff scientist in Ashland's Specialty Ingredients Coatings Innovation group in Wilmington, Delaware since 2016. She received a Master's degree in Materials Engineering from the New Jersey Institute of Technology (NJIT)-New Jersey, and a Master's degree in Polymer Technology from the Cochin University of Science and Technology, India. She is the receipient of American Coatings Award 2020.