EDITORIAL

Solar Cells Based on Nanostructured Organic/Polymeric Materials

Nowadays, the vast majority of solar cells used for this task are among the first and second generation devices, which are made from inorganic materials in various architectural designs. However, the main obstacle in the implementation of these devices is the high cost due to strong requirements to the high purity of the semiconductors and the techniques used in the devices fabrication. Moreover, it is seen that emissions to the environment mainly occur from using fossil-fuel-based energy in generating the materials for inorganic solar cells, modules, and systems.

Over the last two decades great efforts have been made to develop the low cost and ambient temperature processed solar cells based on organic and polymeric materials active layers. Despite easy fabrication of these devices, they are capable of showing extra important features, such as flexibility, light weight, and suitable degradability for recycling purpose. The unsatisfied issues of low power conversion efficiency and stability problem with organic solar cells requires rigorous research studies performed covering from studying various materials for organic solar cells to the devices fabrication and characterization.

This special issue has been devoted to disseminate the cutting edge research works performed by highly experienced researchers in the field of organic/polymeric photovoltaics. The authors have been called to submit their original research works to be considered for publication in this special issue of ***Journal of Technology Innovations in Renewable Energy*** after preforming a peer-reviewing process.

The first paper entitled: **Optical response and photovoltaic performance of organic solar cells based on DH6T:Alq3 active layer.**

Submitted by: *Fahmi F. Muhammad, Abdulkader Jaleel Muhammad and Khaulah Sulaiman*

Reports on the optical and photovoltaic performance of dihexyl-sexithiophene (DH6T) doped with various molar percentages of tris-8-hydroxyquinolinate aluminium (Alq3) dissolved in chloroform/hexane co-solvent. Organic solar cells based on the optimum active layer content were fabricated and tested. Comparably, it was observed that the photovoltaic performance of the DH6T:Alq3 based devices is much better than that achieved for the DH6T:PCBM based ones.

The second paper entitled: **Investigation of Photo-Absorption and Current-Voltage Properties of Liquid Extracts from Fruits for Organic Solar Cells Application**

Submitted by: *Dashty A. Babakr, Hamad H. Bayiz, Hawkar M. Qadr and Fahmi F. Muhammad*

Investigates the optical absorption and photo-current characteristics of some fruit extracts for solar cells application.The results showed that energy gaps of the solutions are located within the visible spectrum. The broad absorption spectra for the samples under investigation have proved the fruits capability to harvest solar energy. Additionally, the enhanced photo-current activity of the fruit solutions under light suggested their potential applicationfor the organic and/or dyes solar cells

The third paper entitled: **Effect of Nano Surface Topography on Electrical Properties of Lead Sulfide (PbS) Films Deposited on Polymer Substrate**

Submitted by: *Mohammad Ghaffar Faraj*

Characterizes the lead sulfide (PbS) films deposited on polymide (PI) plastic substrate by chemical spray pyrolysis technique. Effects of substrate temperature on the electrical properties of the films are studied. In addition, the effect of nano surface topography on electrical properties of PbS films is presented. The results of this work are of specific interest for the researcher working in the field of polymer based flexible solar cells.

The fourth paper entitled: ***In Vitro* Polarized Resonance Raman study of N719 and N719-TBP in Dye Sensitized Solar Cells**

Submitted by: *Søren Hassing, Kit D. Jernshøj, Phuong Tuyet Nguyen and Torben Lund*

Addresses the utilization of unique property of Raman scattering in the organic dye based solar cells, in which the polarization of the scattered light is generally different from the polarization of the laser light. When the excitation is chosen within the visible absorption band of N719 only the skeleton ring-modes in N719 are enhanced and are observed as the most intense bands in the RRS spectra. Experimental results on N719/TiO_2 – DSCs showed that by combining an analysis of the wavenumber dependent polarization of these modes with the small shifts observed in the visible absorption spectra of adsorbed, non-adsorbed molecules and degradation products new and more reliable information about dye stability and about the adsorption of the dye on TiO_2 can be obtained.

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