T. Alshahrani et al., Madridge J Nanotechnol Nanosci. 2017
http://dx.doi.org/10.18689/2638-2075.a2.002

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2nd International Nanotechnology Conference & Expo

April 3-5, 2017 Dubai, UAE

The effect of generation and pH of the new acceptor PAMAM dendritic materials on the organic bilayer solar cells performance

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Due to the importance of harvesting solar energy, the continuous development of solar cells is one of the most important developments in the conversion of solar energy. Recently, organic solar cells show many advantages over inorganic devices such as lightweight, flexibility, low cost and variety materials synthesis with different structures However, organic solar cells efficiency is still below 10% and it's affected by many factors such as the choice of materials and fabrication techniques.

Dendrimers are a new class of polymeric materials that are composed of highly branched, well-defined and nature monodisperse macromolecules, which can support the charge transport and film morphology. Multifunctional Polyamidoamine (PAMAM) dendrimers as flexible light harvesting antennae with high efficiency electron transfer was used as the acceptor while Poly (3-hexylthiophene) (P3HT) was used as donor due to their low band-gap and efficiency in organic photovoltaic applications. This work investigate the effect of generation and pH of the new PAMAM dendritic wedges (G0.5, G1.5, G2.5) salt on the organic bilayer solar cells in order to improve their performance and morphology. The structure with (G0.5, G1.5, G2.5) salts at neutral pH level resulted in much improved surface morphology and enhances the charge mobility. It was observed thatincreasing PAMAM dendritic generation from G0.5 to G2.5 influence significantly the bilayer OHJ solar cells efficiency performance. Power-conversion efficiencies (PCE) of 7% were achieved at the natural PAMAM G2.5.Thin films of PAMAM at neutral pH exhibits a major peripheral distribution where in the low pH it was found to be shrink.

Biography:

Dr. Thamraa Alshahrani received her BSc degree in physics from the University of King Khalid University, Abha, Saudi Arabia in 2007, and an MSc in Nanotechnology and Microfabrication from Bangor University, UK, in 2010. She was awarded a PhD from Bangor University, UK, for work on the Advanced Materials for Organic Solar Cells: Influence of Generation and pH on PAMAM-Based Devices in the year 2016. Currently she is Assistant Professor in physics department, college of science in Princess Nora bint Abdul Rahman University, Riyadh, Saudi Arabia. Particular areas of her interest is Implementing nanotechnology in renewable energy.