

Hybrid bulk-heterojunction solar cells based on poly(3-hexylthiophene) and ZnO nanostructures

Wednesday, May 20, 2015 2:00 PM (3h 30m)

Photovoltaic performance of hybrid ZnO nanorods (ZnO NRs)/ polymer solar cells is enhanced through the addition of ZnO nanoparticles (ZnO NPs) into poly(3-hexylthiophene) (P3HT) absorber layer. A mixture of ZnO NPs:P3HT, acting as photo-active layer, is coated onto ZnO NRs, serving as electron acceptor, by spin-coating technique. The ZnO NPs/P3HT blend is able to infiltrate into the interrod space, as confirmed by field emission scanning electron microscopy (FE-SEM) observation. The ZnO NPs/P3HT (13% by volume) blend-coated ZnO NR device shows the maximum power conversion efficiency of 1.02%, which is higher than that of the pristine ZnO NRs/P3HT device (0.26%). The enhancement is mainly attributed to the larger ZnO/P3HT interface area and higher charge collection, as observed by an increase of the external quantum efficiency.

Primary author: Dr RUANKHAM, Pipat (Department of Physics and Materials Science, Faculty of Science, Chiang Mai University, Chiang Mai, THAILAND 50200)

Co-author: Prof. SAGAWA, Takashi (Graduate School of Energy Science, Kyoto University, Kyoto, JAPAN 606-8501)

Presenter: Dr RUANKHAM, Pipat (Department of Physics and Materials Science, Faculty of Science, Chiang Mai University, Chiang Mai, THAILAND 50200)

Session Classification: Poster-1

Track Classification: Photonics and Optoelectronics