ST-P011

Photonic Crystal Effect of Nano-Patterned PEDOT:PSS Layer and Its Application to Absorption Enhancement of ZnPc Thin Films

Jiyoung Han, Ilwhan Ryu, Dasom Park, Hyemin Kwon, Sanggyu Yim*

Department of Chemistry, Kookmin University, Seoul 136-702, South Korea

It is widely accepted that short exciton diffusion lengths of organic semiconductors with respect to the film thickness limit the charge (hole and electron) separation before excitons recombination in organic photovoltaic (OPV) cells. Therefore the efficient absorption of incident light within the thin active organic layer is of great importance to improve the power conversion efficiency (PCE) of the cells. In this work, we fabricated 2-dimensionally (2D) nano-patterned poly(3,4-ethylenedioxythiophene):poly(styrenesulfonate) (PEDOST:PSS) layers using capillary phenomenon and nano-imprinting technology at the scale of several hundred nanometers. This 2D nano-patterned PEDOT:PSS layer exerted photonic crystal effect such as redirection of light paths and variation of light intensity at specified wavelengths. It is also expected that the consequently alternated light pass lengths and intensities change the absorption properties of zinc phthalocyanine (ZnPc) thin films grown on top of the nano-patterned PEDOT:PSS layer. The influence of conductivity and thickness of the PEDOT:PSS layer on the absorption properties of ZnPc thin films were also investigated.

Keywords: Photonic crystal, Nano-Patterned PEDOT:PSS, ZnPc, Absorption Enhancement