

Enhanced Light Harvesting Efficiency of Dye Co-sensitized Solar Cells prepared with the One-bath Mixed Dye Solution Process

김영락, 박지영, 손동균, 안광순, 김재홍\*  
영남대학교 화학공학부  
(jaehkim@ynu.ac.kr\*)

There has been an increasing interest in the dye sensitized solar cell (DSSC) owing to a potential for highly efficient solar energy-to-electricity conversion efficiency, low-cost and easy manufacturing process. DSSC could be constructed with dye-absorbed wide band gap oxide semi-conductor electrode such as  $\text{TiO}_2$  or  $\text{ZnO}$ , electrolyte containing  $\text{I}^-/\text{I}_3^-$  redox couples, and Pt coated counter electrode. It was known that solar energy conversion efficiencies of DSSC are strongly dependent on dye molecules absorbed on the  $\text{TiO}_2$  surface which used for photosensitization of sun light, since an excited state of dye could inject an electron into the conduction band of semiconductor. In this paper, we designed and synthesized a series of organic photosensitizers containing long wavelength absorbing chromophore for the DSSC. The organic dyes containing squaraine chromophore could absorb long wavelength region which could be strong candidates for the Blue/NIR sensitizers for the DSSC. The photovoltaic properties and the incident photon-to-current (IPCE) efficiencies of DSSCs containing long wavelength absorbing organic chromophores were measured and evaluated by comparison with that of individual chromophores.