

신규 Carbazole 유도체의 합성과 이를 적용한 DSSC의 광전 변환 특성

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Synthesis and Photovoltaic Properties of Organo Dendritic Photosensitizers based on Carbazole for Dye-sensitized Solar Cells.

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Since Grätzel et al. reported the first efficient dye-sensitized solar cells(DSSCs) in 1991, they have attracted much attention due to their relatively high power conversion efficiency and potentially low cost production.

To date, high performance and good stability of DSSC based on Ru-dyes as a photosensitizer had been widely addressed in the literatures. However, the Ru-dyes are facing the problem of manufacturing costs and environmental issues. In order to obtain even cheaper photosensitizers for DSSC, the metal-free organic photosensitizers are strongly desired.

The metal-free organic dyes offer superior molar extinction coefficients, low cost, and diverse molecular structures as compared to the conventional Ru-dyes, In this work, we have studied on the synthesis and characterization of the organo dendritic dyes containing different number of electron acceptor moieties in a molecule.

Key words : Photosensitizers, DSSC, Carbazole derivatives, Synthesis, photovoltaic properties

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페노시아진을 이용한 염료감응형 태양전지 고효율 염료합성

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Synthesis and Photovoltaic Properties of Organic Photosensitizers for Application of Dye Sensitized Solar Cells

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Dye-sensitized solar cells (DSSC) are currently attracting wide spread academic and commercial interest for the conversion of sunlight into electricity because of their easy manufacturing process and high efficiency. The solar energy conversion efficiencies of DSSC are strongly dependent on dye molecules adsorbed on the TiO₂ surface which used for photosensitization of sun light, since an excited state of dye could inject an electron into the conduction band of semiconductor.

We have developed novel organic dyes which have phenothiazine moieties as an electron donor in their charge-transfer chromophore for application of DSSCs. We had synthesized a series of phenothiazine derivatives which have different wave length absorbing chromophore in the molecule with high molar extinction coefficient. The photovoltaic performance of DSSC composed of organic chromophores with broad wavelength absorption property were measured and evaluated by comparison with that of pristine ruthenium dye.

Key words : Organic Dye(유기염료), DSSC(염료감응형 태양전지), Organic Photosensitizers(유기광감응체)

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