Synthesis of Photovoltaic Properties of Multi Chromophores Contained with Long Alky Chain for Dye-Sensitized Solar Cells

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The organic dyes with double electron acceptors have recently been reported to be very favorable for the DSSCs, compared to those with single electron acceptor, due to the more efficient electron extraction paths from electron donor and the higher molar extinction coefficients. However, the DSSCs using the organic dyes have yet been much less stable than the Ru-based dyes, due to the formation of unstable radicals under continuous light illumination and the dye desorption from the TiO2 nano-particle surfaces. In this article, 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.