

Photovoltaic Property of Multi Chromophores connected with Long Alky Chain for Dye-sensitized Solar Cells

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Dye-sensitized solar cells (DSSCs) have attracted much attention of many research groups on account of their benefits, for instance, of low-cost fabrication process with decently high solar energy-to-conversion efficiencies compared to conventional p-n junction solar cells. 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.