

## Enhanced Electron Life Time and Long-Term Stability in Dye-sensitized Solar Cells optimized with Organic Dye Containing Tri-Anchoring in a Chromophore

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An organic sensitizer with a multi-anchoring system in a chromophore is a versatile methodology for enhancing the stability and photon-to-current efficiency of dye-sensitized solar cells (DSSCs). The derivatives of triphenylamine containing different numbers of cyanocarboxylic acids in the chromophore (TPA3T1A ~ 3A) were synthesized to determine the correlation between the number anchoring groups and the photovoltaic properties as photosensitizers for DSSCs. The adsorption properties of the organic dyes on the TiO<sub>2</sub> electrode were examined by ATR-FT-IR, which revealed a TPA3T1A-containing mono-anchoring system adsorbed on the electrode surface in monodentate ester-type mode, and three carboxylic acids in TPA3T3A adsorbed in bidentate bridging mode. Enhanced long-term stability and electron life time were observed in the DSSCs containing a tri-anchoring system compared to mono- and bi-anchoring systems because of the strong adsorption properties and the effect of blocking the electrolyte from the TiO<sub>2</sub> electrode surface.