

Study of dye-sensitized solar cells with high efficiency based on novel mixed organic dyes

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The aim of this research is developing efficient and stable dye-sensitized solar cells (DSSCs). We focus on the development of the following two key materials: 1. the organic dyes do not contain noble metals; 2. high surface area nanocrystalline metal oxides electrodes. As organic dyes have narrow absorption spectrum profiles in the visible light region, we prepared the DSSCs consisting of mixed phthalocyanine and azo dyes instead of single dye system to utilize the broad spectrum of sunlight. The absorbance of mixing dyes was characterized by the UV-vis spectra. We used sol-gel method to prepare the TiO₂ membrane electrode of the DSSCs. The crystalline phase and surface morphology of titanium oxide were characterized by using XRD, and SEM to investigate the effects of processing parameters on the films characteristic and microstructure. The performance of DSSCs was characterized by using I-V curve analysis.