

# Small molecule organic semiconductors: from dye-sensitized solar cells to molecular photocatalysis

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Organic semiconductors have gained tremendous attention in applications such as organic light emitting diodes (OLEDs), organic solar cells (OSCs) and organic thin film transistors (OTFTs) because of their unique optical and electronic properties originated from the  $\pi$ -conjugated structure. Among these, organic solar cells, which can directly harvest energy from sunlight, are regarded as a promising means to meet the increasing demand for clean and renewable energies. It is commonly believed that a consequence of photoexcitation, exciton diffusion then exciton dissociation is involved to transform the light into electricity, namely, a photo-induced free electron/hole formation process.

Here, the study of a novel application field of small molecule organic semiconductors in the field of molecular photocatalysis is introduced. Taking advantage of the light-induced electron/hole generation, both active sides of the organic semiconductors have been studied in specific C–C formation reactions promoted under visible light irradiation. Detailed mechanism study will be shown for the unique design principle for this new class of material in the field of molecular catalysis in organic chemistry.

