

## Carbon–Carbon Decoupling Reaction by Photocatalytic Hydrogen atom Abstraction

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Plastic is a promising material that is generally used for various purposes. However, it's recycling ratio is below 20% and most of them are incinerated or landfilled. These make enormous damage to human beings, such as environmental and economic problems. In this study, Carbon–Carbon (C–C) decoupling reaction of the plastic model molecule (1,3-Diphenylpropane) is demonstrated to solve this problem. Specifically, hydrogen atom abstraction is driven by several methods, which is known as the rate-determining step of C–C decoupling reaction. Phenylbis(2,4,6-trimethylbenzoyl)phosphine oxide (BAPO), Cerium chloride (CeCl<sub>3</sub>), Cadmium sulfide quantum dots (CdS QDs) were used for efficient hydrogen atom abstraction and their performances are compared. As a result, CdS QDs showed the highest performance as photocatalysts and the reason is their unique characteristics such as high dispersity and large extinction coefficients.