Development of Novel Additive-Enhanced Dye for Environmentally Friendly, Sustainable, and Efficient Dye Sensitized Solar Cells

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In this project, sustainable dye sensitized solar cells were optimized by fabrication of a novel organic dye composition which improved the stability and efficiency of the cell. A dye material comprising novel stabilizing components added to plant derived anthocyanin complexes was developed to be implemented as the heterojunction layer in an organic dye-sensitized solar cell. The stabilizing additives include tin-chloride, l-lysine and fumaric acid, used to stabilize protein interactions and enzyme reactions, thus improving the efficiency and stability of the anthocyanin containing, organic dye-based solar cell. A particularly effective dye composition comprises fumaric acid at 0.1%-1.0% concentration, l-lysine at 0.1%-1.0% concentration, and tin chloride at 1.0%-10.0% concentration. Thus, a novel, inexpensive, environmentally friendly and sustainable solar cell can be produced.

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