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Characteristics of nanostructure dye-sensitized solar cells using food dyes

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Abstract:

Dye-sensitized solar cells (DSSCs) were prepared using various food dyes. Food dyes are economically superior to organometallic dyes since they are nontoxic and inexpensive. The spectrophotometric evaluation of chosen food dyes in solution and on a TiO₂ substrate show that the dyes form J-aggregation on the photoelectrode substrate. Oxidation of potential measurements for used food dyes ensured an energetically permissible and thermodynamically favorable charge transfer throughout the continuous cycle of a photoelectric conversion. The performance of dye-sensitized solar cells based on food dyes was studied. The results illustrate that the dye containing carboxylic acid and sulfonic acid as the acceptor group gave the maximum conversion efficiency 4.20%.