

Experimental and DFT study of natural curcumin derived dyes as n-type sensitizers

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Abstract

In this paper, four different bio-inspired curcumin dyes were explored as n-type sensitizers in regenerative TiO₂ based photoelectrochemical cells in order to rationalize their structure/performance relationships for solar energy conversion. To this end, photoelectrochemical measurements were combined with quantum chemical computations in order to address curcumin binding mode to the semiconductor and the consequent effects on their electronic structure. In our conditions, it was found that the best conversion efficiency of the solar cell fabricated using 1,7-bis-[4-hydroxy-3-methoxy-phenyl]-1,6-heptadiene-3,5-dione (curcumin) was 1.0%. © 2021

Author keywords

APCE; Curcumin dyes; DFT; DSSC; EDDM; IPCE