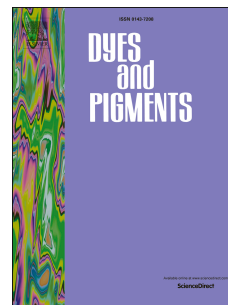


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New organic sensitizers using 4-(cyanomethyl)benzoic acid as an acceptor group for dye-sensitized solar cell applications

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Key Words

Dye-sensitized solar cells, Donor- π -acceptor, Oligothiophene, 4-(cyanomethyl)benzoic acid

Abstract

Two design elements for donor-acceptor organic dyes used in dye-sensitized solar cells (DSSCs) are presented. 4-(Cyanomethyl)benzoic acid was used as an acceptor group and was compared to the commonly used cyanoacrylic acid acceptor group in a pair of otherwise structurally equivalent sensitizers. The 4-(cyanomethyl)benzoic acid based dyes showed significantly improved photovoltaic performance when tested in DSSCs. Furthermore, it was shown that the replacement of the bridging *para*-phenyl group with a thiophene group in triaryl-amino-oligothiophene-based sensitizers resulted in a significant spectral red-shift and improved device performance when tested in DSSCs. DSSCs that were constructed using a sensitizer embodying both the design features show an increase in electron lifetime when

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