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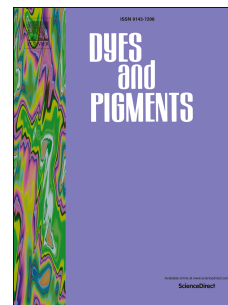
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# Ternary Organic Solar Cells incorporating Zinc Phthalocyanine with Improved Performance Exceeding 8.5%

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## Graphical Abstract

Ternary organic photovoltaic devices have been fabricated, by introducing for the first time, a soluble zinc phthalocyanine (ZnPc) small molecule into the poly-({4,8-bis[(2-thylhexyl)oxy]benzo[1,2-b:4,5-b']dithiophene-2,6-diyl}{3-fluoro-2-[(2-ethylhexyl)carbonyl]thieno[3,4-b]thiophenediyl} (PTB7):[6,6]-phenyl-C<sub>71</sub>-butyric acid methyl ester (PC<sub>71</sub>BM) active layer. The ZnPc acts as an electron cascade material, providing an efficient energy level offset between the polymeric donor (D) and the fullerene derivative acceptor (A), enhancing charge transfer, reducing exciton recombination and thus improving the photovoltaic performance of the devices. The fabricated ternary organic solar cells of the structure ITO/PEDOT:PSS/PTB7:ZnPc:PC<sub>71</sub>BM/Ca/Al led to a champion power conversion efficiency (PCE) of 8.52%, increased by ~15% compared to the reference binary cell.



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