

Diblock-copolymer templates as structure directing agents in solar cells

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Controlling structure is central to achieving reproducible high performance for organic based and dye-sensitised solar cells. One of the processes we have recently developed employs diblock-copolymer templates as structure directing agents for mesoporous TiO₂. A range of controlled mesostructures are integrated into both solid-state organic-based and liquid electrolyte-based dye-sensitized solar cells and polymer/TiO₂ solar cells. The resultant solar cells perform remarkably well and our analysis goes some way to improving our understanding of the structure-function relationships in this class of photovoltaics.

Specific research interests include studying the charge transport in metal oxides and organic semiconductors, understanding the charge generation and recombination processes occurring at the light absorbing heterojunctions, and improving these mechanisms by interfacial engineering and optimisation of nano- and mesostructures.