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**Unconventional Routes for the Enhancement of the Efficiency of Dye-Sensitized Solar Cells (DSSCs) Based on Self-Assembled Block Copolymer Nanotemplates** YOONHEE JANG, DONGHA KIM, Ewha Womans University — We introduce distinctly different and creative two strategies for improving the efficiency of $TiO_2$-based DSSCs by incorporation of tailored hybrid nanostrcutures prepared from self-assembled block copolymer nanotemplates. Firstly, carbonized $TiO_2$ thin layer was incorporated into at the interface either between the transparent electrode and $TiO_2$ NP layers or between the electrolyte and $TiO_2$ NP layers. Massively-ordered arrays of $TiO_2$ dots embedded in carbon matrix were fabricated via direct carbonization of UV-stabilized PS-*b*-P4VP block copolymer films containing $TiO_2$ sol-gel precursors. DSSCs containing carbon/$TiO_2$ thin layers exhibited remarkably enhanced overall power conversion efficiency compared with DSSCs based on neat $TiO_2$ NPs. Secondly, we introduce a new class of organic/inorganic 1D photonic crystals exhibiting stop bands in the specific wavelength range, which was created by stepwise layer-by-layer deposition of UV-crosslinked BCP reverse micelle layers. The simple yet novel 1D layered BCP films have been introduced into the back-side of the counter electrodes as light reflector in DSSCs system to increase the light harvesting of dye.

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