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Coaxial Titanium Vanadium Nitride Core–sheath Nanofiberswith Enhanced Electrocatalytic Activity for Triiodide Reduction in Dye-sensitized Solar Cells

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Abstract

Coaxial titanium vanadium nitride core–sheath nanofibers (VN@TiN) with mesoporous structure are fabricated and explored as efficient Pt-free counter electrodes (CEs) for Dye-sensitized Solar Cells (DSCs). For these nanofibers, the TiN core is covered with a sheath of VN, and their boundary is a continuous series of TiVN solid solutions. Both electrochemical tests and density functional theory computations indicate that the combination of core-sheath nanofibers structure design and the formation of TiVN solid solutions significantly enhance the triiodide reduction activity of parental TiN and VN. Impressively, the devices employing