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Review

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Review

Review on the recent progress of carbon counter electrodes for dye-sensitized solar cells

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Abstract

Carbon counter electrodes for dye-sensitized solar cells (DSSCs) have attracted great interest recently because of their low cost, excellent catalytic activity, and superior chemical stability, which are potential alternatives to expensive Pt electrodes for the large-scale DSSCs application. In this perspective, the recent significant progress in preparing various forms of carbon counter electrodes for DSSCs is systematically summarized, and the pivotal factors in determining catalytic performance of carbon counter electrodes is highlighted in detail. Besides, in order to further optimize catalytic activity of various carbon materials for high-performance DSSCs, we also selectively discuss and summarize the effective strategies to enhance the short circuit current, tune the open circuit voltage, and improve the fill factor of DSSC by modulating the physical and chemical properties of carbon counter electrodes. Finally, the main problems and challenges in preparing and applying various carbon counter electrodes in DSSCs are addressed, which are in urgent need to be solved and thus may contribute to design highly efficient carbonaceous electrocatalysts for high-performance DSSCs in future.

Keywords: Dye-sensitized solar cell; Counter electrode; Carbonaceous material;

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