Short Communication

An Approach to Solar Rechargeable Flow Battery Based on Electroactive Organic Redox Couples

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An integrated photo-electrochemical solar energy conversion and storage device is developed by a dye sensitized TiO₂ solar cells and 2, 2, 6, 6-tetramethyl-1-piperidinyloxy (TEMPO) / 1, 4-Benzoquinone (BQ) redox flow batteries. The device can be directly charged by solar light without external bias, and discharged like normal RFBs with an energy storage density of 3.5 mAhg⁻¹ over many cycles. The proposed device demonstrates a rapid photo-charge at light illumination and a stable electrochemical discharge in the dark, realizing an in situ photo-to-chemical-to-electrical conversion and photo-to-chemical storage.

Keywords: Solar cells; Rechargeable flow battery; Charge storage; Organic redox couples

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