Bismuth Trioxide Modified Carbon Nanotubes as Negative Electrode Catalysts for all Vanadium Redox Flow Batteries

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Bismuth trioxide modified carbon nanotubes (Bi₂O₃/CNTs) composite was fabricated by liquid phase deposition-calcinating method and used as electrocatalyst for V³⁺/V²⁺ redox couple of all vanadium redox flow batteries (VRFBs). The modification of Bi species at the surface of CNTs can significantly inhibit the hydrogen evolution reaction and enhance the electrochemical activity to the V²⁺/V³⁺ redox reaction. The VRFB single cell with Bi₂O₃/CNTs modified graphite felt as negative electrode exhibits excellent energy storage performances, such as higher charge/discharge capacity and energy efficiency, indicating that the V²⁺/V³⁺ redox reaction can be facilitated significantly by Bi₂O₃/MWCNTs composite.

Keywords: bismuth trioxide; carbon nanotubes; vanadium redox flow batteries; hydrogen evolution overpotential

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