

Enhanced Performance of an All-Vanadium Redox Flow Battery Employing Graphene Modified Carbon Paper Electrodes

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Abstract : Fuel cell grade gas-diffusion layer carbon paper (CP) electrodes are subjected to electrophoresis in N,N'-dimethylformamide (DMF) consisting of reduced graphene oxide (rGO). The rGO modified electrodes are compared with CP in a single asymmetric all-vanadium redox battery system (employing a double serpentine flow channel for each half-cell). Peak power densities improved by 4% when the rGO deposits were facing the ion-exchange membrane (cell performance was poorer when the rGO was facing the flow field). Cycling of the cells showed least degradation of the CP electrodes that were coated with rGO in comparison to pristine samples.

Keywords : all-vanadium redox flow batteries, carbon paper electrodes, electrophoretic deposition, reduced graphene oxide

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