**Performance Stability of Membrane Having Two Functionalized Properties Prepared Using Radiation Grafting In Redox Flow Cell Battery**

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The original polymeric materials have limited functionality and need to be modified to impart desired functionality and properties onto the polymer substrates including membranes. The polymer electrolyte membrane plays important role in energy storage applications and it is used as separator to physically separating the positive and negative electrodes and prevent electrical short circuits during the flow of ionic charge. Among the key features required for the membrane including high proton conductivity, good mechanical and chemical stability and low cost. The perfluorosulfonic acid (PFSA) membranes are commercially used in VRFB and its disadvantages includes undesired electrolytes crossover and high cost. In this study we explore the modification of the membrane using radiation grafting of dwi-monomers onto hydrocarbon membrane to fabricate dwi-functional groups having high proton conductivity property and improved vanadium permeability across the membrane. The prepared membrane was tested for conductivity and chemical stability of the developed membranes. The performance of VRFB with selected membrane was evaluated in the charge-discharge cycles and compared to values for commercial PFSAs membrane. The results demonstrated low vanadium permeability good performance, high proton conductivity and excellent cycling stability for developed membranes.

Keywords: Radiation grafting, surface modification, redox flow cell battery, energy storage