Carbon Electrode Treatment to Improve the Performance of the Aqueous Redox Flow Battery

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Redox Flow Battery (RFB) is one of the Energy Storage System (ESS) that has the advantages of high stability and design independence of capacity and power. The Vanadium Redox Flow Battery (VRFB) has been actively studied. However, it has difficulties in commercialization because of the high price of vanadium used as active material.

In order to solve the problem, various active materials to replace vanadium are being studied. Among them, Iron-Triisopropanolamine (Fe(TIPA)) complex and Cobalt-Triisopropaolamine (Co(TIPA)) complex were stable in alkaline condition and used as the active materials in RFB. This Co/Fe-TiPA RFB has an Open circuit Voltage (OCV) of 0.96 V. However, although this RFB has a good OCV of almost 1V, it needs improvement because it has low energy efficiency due to low electrode reaction rate. Therefore, we tried to improve the performance of this RFB by treating the electrode in various ways to increase the reaction rate of the electrode. We have compared the treated felt through the half-cell test, XPS, SEM and we performed a full cell test.