Optimization of iron and cobalt based organometallic redox couples

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Redox Flow Battery (RFB) is one of the Energy Storage System (ESS) that converts electrical energy into chemical energy and converts chemical energy back into electrical energy. The RFB has the advantages of high stability and design independence of capacity and power. However, Vanadium Redox Flow Battery (VRFB), which has been actively studied, has difficulties in commercialization because of the high price of vanadium used as the active material.
In order to solve this problem, we have studied the system of Alkaline Redox Flow Battery (ARFB) which uses cobalt and iron that has a lower cost than vanadium as active materials. The metal-ligand complex was prepared by using an amino alcohol ligand to convert the transition metal into an active material under alkaline conditions. We conducted electrochemical and thermodynamics analyzes of these complexes. In addition, RFB using Co-L/Fe-L as active materials was stably operated without deterioration of capacity for 100 cycles.