Stability Enhancement of All-Iron Redox Flow Battery

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As demand for energy storage systems (ESSs) increases, research on redox flow batteries (RFBs), secondary batteries for ESSs, is actively underway. Among them, all-iron RFBs, which use iron-based materials for both the cathode and anode, have advantages in price and cell voltage. Among the negative active materials constituting the iron-based redox flow battery, iron-triethanolamine complex (Fe(TEA)) has a side reaction problem, which adversely affects the operation of the RFB. To solve this problem, a more stable iron-based active material was obtained by replacing the existing ligand, but complete stability was not secured in the entire all-iron RFB system. In this study, we tried to secure the long-term stability of the system through solution optimization. We secured the long-term stability of the RFB by controlling the acidity and concentration of the solution. As a result, the long-term stability was confirmed for about 20 days.