

Selective lithium recovery from brine using LNCM/Ag battery system

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$\text{LiNi}_{1/3}\text{Co}_{1/3}\text{Mn}_{1/3}\text{O}_2$ (LNCM) was investigated for its feasibility in selective electrochemical lithium recovery in brine solution. The recovery system consists of LNCM and Ag as Li^+ intercalating electrode and a chloride capturing electrode respectively. LNCM was first oxidized (Li extracted) to facilitate its Li preference during capture phase (discharging). The captured ions were then released (charging) to a separate cell containing a recovery solution. Repetitive Li capture–release process and cyclic voltammetry showed high selectivity and stability of the electrode in the presence of other competing cations (Na^+ , K^+ , Ca^{2+} , Mg^{2+}). Overall, the results demonstrate the ability of the electrochemical system to selectively recover Li^+ from aqueous sources with comparable energy consumption. This work was supported by the National Research Foundation of Korea (NRF) funded by the Ministry of Science and ICT (No. 2016R1A2B1009221 and No. 2017R1A2B2002109), and the Ministry of Education (No. 2009-0093816).