

### Fabrication, Characterization and Lithium adsorption of Acid-Treated Dilithium Dioxido(oxo) manganese ( $\text{Li}_2\text{MnO}_3$ ) adsorbents

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Acid-treated  $\text{Li}_2\text{MnO}_3$  were synthesized by solid-state reaction between  $\text{Li}_2\text{CO}_3$  and  $\text{MnCO}_3$  at 500–700°C. HCl,  $\text{H}_2\text{SO}_4$  and  $\text{HNO}_3$  solutions (2.5 N) were used to leach  $\text{Li}^+$  prior to adsorption experiments. Elemental compositions of the adsorbents were determined by ICP-MS, average oxidation state determination and acid-base titration. XRD, FE-SEM, thermal analysis and BET surface area analyses were also conducted.  $\text{Li}^+$  leaching reveals that HCl treatment exhibited the highest extraction (83%). However, the physical structure of  $\text{Li}_2\text{MnO}_3$  was compromised in HCl as indicated by high  $\text{Mn}^{4+}$  leaching (22%); those in  $\text{H}_2\text{SO}_4$  and  $\text{HNO}_3$  were only < 2%. Improved stability and reduced  $\text{Li}^+$  leaching were observed in adsorbents prepared at higher temperatures. Further enhancements on the stability and adsorption properties are currently under investigation. This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government (MEST) (No. 2012R1A2A1A01009683).