

Spinel $\text{Li}_{1.6}\text{Mn}_{1.6}\text{O}_4$ /Polyacrylonitrile (PAN) composites: Comparison on nanofiber and flat sheet membranes for Li^+ recovery

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Polyacrylonitrile (PAN) membranes have been widely used as membrane filters due to its thermal and chemical stabilities, and intrinsic hydrophilicity. PAN was used as a membrane support for the preparation of composite membranes incorporated with $\text{Li}_{1.6}\text{Mn}_{1.6}\text{O}_4$. Two membrane configurations were tested: nanofiber and flat sheets were prepared via electrospinning and phase inversion methods, respectively. Spinel $\text{Li}_{1.6}\text{Mn}_{1.6}\text{O}_4$ particles, derived from calcination of LiMnO_2 at 450°C for 4 h, were used as adsorbents for Li^+ ions in water. Adsorbent and composite membranes were acid treated with 0.5 M HCl solution to activate the adsorption sites. The morphology, mechanical property and porosity of composite nanofiber and flat sheer membranes were characterized by SEM, UTM and BET, respectively. Comparison of the membrane performances for Li^+ adsorption were performed at varied pH conditions. This work was supported by National Research Foundation of Korea (NRF) grant funded by the Korea Government (MEST) (No. 2012R1A2A1A01009683 and 2012-0006693).