**Composite Membrane for lithium extraction by dialysis**

**and electrodialysis**

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Abstract.

With population growth and energy requirements, lithium batteries are emerging as one of the most promising energy storage alternatives. Besides are omnipresent in all electrical devices.

Li which is the crucial element in these batteries, and is considered as one of the most energy-critical elements demand for its resources could reach 900,000 t/year by 2025, which also calls for increased production of Li salts to meet the growing need for this "white gold" metal.

Membrane techniques are among the most promising methods for extracting lithium from aqueous resources (seawater, lakes, etc.). These techniques are easy to implement and have little impact on the environment.

Our work aims to develop Li+ ion-selective composite membranes based on LICGC glass-ceramic particles dispersed in a polymer matrix.

Used in Dialysis and Electrodialysis, the synthesized membranes showed good selectivity for Li+ ions. Preliminary diffusion dialysis tests using the prepared membranes showed significant selectivity for Li+ ions compared with Na+ and K+ ions when mixed at the same concentration in the source solution. The best membrane, LCM5, has a selectivity coefficient of S(Li+/Na+) equal to 376 when treating a mixture of LiCl + NaCl and a coefficient S(Li+/Na+) = 276 and of S(Li+/K+) = 373 when treating another mixture of LiCl + NaCl + KCl. The transfer of Li+ ions was also studied by electrodialysis using two types of cell, and the effect of different parameters was examined. The results also demonstrated the selectivity of LCM5 for Li+ ions in ED selectivity. The application of LCM5 in adsorption of Li+ ions was also tested and revealed a significant selectivity coefficient of S(Li+/Na+) of 161.

***Key words****:* Composite membrane, diffusion dialysis, electrodialysis, selectivity