



Development of synthetic solid inorganic material as adsorbents of Li and K from the enrichment brine

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ABSTRACT

The disposal concentration from seawater desalination plant has a significant impact on environment, which needs to pay strict attention due to the rapid development of desalination plant. The chemical elements extracted from seawater are very scarce on land such as potassium or very expensive such as lithium. The abstraction selectivity of them as the salt co-products using the synthesis solid inorganic material was tested in the lab. The results show that the technology is feasible to recover lithium as LiCl by ion sieve material (denoted IS-Li) which has good selectivity for lithium ions from the concentrated brine and the adsorption capacity is 25 mg g⁻¹. And there are insignificant effect from the competed ions, although the order of effect on the capacity is K > Ca > Mg > Na. The material (denoted A-K) which obtained from zeolite has good adsorption capacity of potassium of about 20 mg g⁻¹ in the condition of mixed concentrated brine, but the maximum adsorption amount decreased due to the effect of other ions. The effect of coexisting ions other than the uptake of lithium is in the order of Na > Ca > Mg. The selectivity of the inorganic material for lithium and potassium and preliminary process design with the seawater desalination were provided in this paper.

Keywords: Brine; Desalination; Lithium; Potassium; Environmental impact; Adsorption

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