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Reactive Crystallization of Li_2CO_3 from Pseudo Sea Water

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Summary

Introduction To recovery lithium ions from sea and/or lake, lithium carbonate was precipitated by using a single-jet crystallizer in the presence of magnesium ions as an impurity. In this study, influence of addition rate and impurity dosage (Mg^{2+}) on precipitation process of lithium carbonate was investigated.

Experimental Magnesium chloride was added to the 1 mol/L of lithium chloride aqueous solution. Lithium dosage was ranged from 3.0 to 5.0 g/L. Prepared solution was introduced into a crystallizer (2 L) and 1 mol/L of sodium carbonate was fed by rotary pump at 30 mL/min. Agitation rate was 500 rpm. After precipitation, product slurry was filtrated and dried. Obtained crystals were observed by microscopy and crystal size distribution was analyzed.

Experimental results Obtained crystals was hexagonal and plate morphology and crystal size was ranged from approximately 300 to 400 μm (**Fig. 1**). Furthermore, crystal size decreased by increasing in magnesium dosage and influence of magnesium dosage on crystal size distribution width could not be seen. In this study, 3.0 g/L of magnesium dosage caused the narrowest size distribution width (**Fig. 2**).

Conclusion Magnesium ion as an impurity influenced on crystallization process of lithium carbonate. The result will be useful for recovery process of lithium ions from sea water.

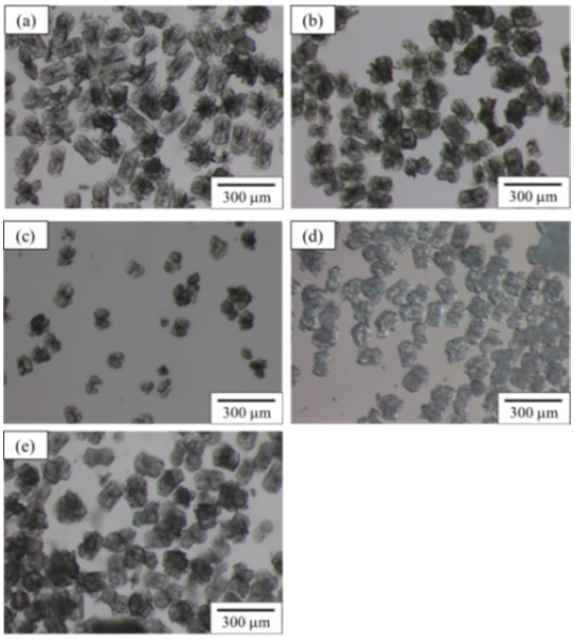

Fig. 1. (right) Influence of magnesium dosage on lithium carbonate crystals **(a)** 3.0 g/L, **(b)** 3.5 g/L, **(c)** 4.0 g/L, **(d)** 4.5 g/L, **(e)** 5.0 g/L

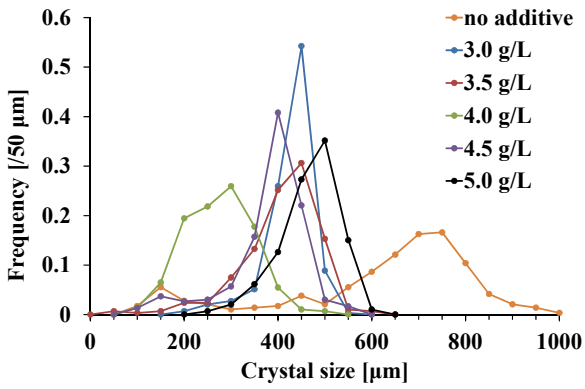

Fig. 2. (left) Influence of magnesium dosage on crystal size distribution of lithium carbonate