

The influence of anti-solvent on hot carbonate process for crystallization-based CO₂ capture

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Although CO₂ capture process received much attentions for recent years, the high energy demand of CO₂ capture process makes its application for practical industries difficult. For energy-saving crystallization-based CO₂ capture, using not only cooling crystallization method, but also drowning out crystallization is favourable. Therefore, in this work, the availability of drowning out crystallization method was investigated. When adding anti-solvent into the potassium carbonate/bicarbonate solution, salt formation, which is related to crystallization yield was observed. The yield by anti-solvent was increased about 15%. When adding anti-solvent, liquid-liquid-solid phase separation was also observed. The anti-solvent rich phase was immediately separated from the potassium bicarbonate/carbonate solution. The Liquid-liquid separation was important because it is related to easy recycle of anti-solvent in the process. Therefore, the drowning out crystallization method with organic anti-solvent can be applied in the crystallization-based CO₂ capture process using potassium carbonate/bicarbonate solution.