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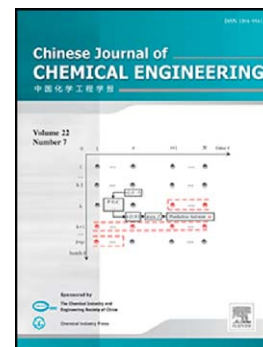
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Catalysis, kinetics and reaction engineering**Synthesis of Epichlorohydrin from 1,3-Dichloropropanol Using Solid Base[☆]**

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Abstract

In this work, the synthesis of epichlorohydrin (ECH) from 1,3-dichloropropanol (DCP) by using solid sodium hydroxide (NaOH) is carefully investigated. Inert organic solvent, 1-octanol, is introduced to ensure reaction intensity under control. The reaction performances with respects of apparent kinetics and selectivity are determined to explore optimized reaction conditions and confirm potentials for enhancing productivity in one batch. The dissolution and liquid phase reaction mechanism and instant reaction assumption are proposed and verified through process analysis. A process design towards free additional water is schematically figured out to manipulate solid NaOH, by-product, and unreacted starting materials to realize a nearly closed circuit. This process allows high selectivity over 97 % and complete DCP conversion at 323.2 K within a reaction time less than 20 min. Other advantages includes near-zero wastewater emission, economically possible NaOH regeneration from NaCl, and robust operating condition window.

Keywords: Clean processes, Reaction, Process design, Kinetics, Multiphase

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