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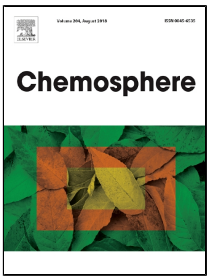

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Synthesis of Na-A zeolite from Jeju Island scoria using fusion/hydrothermal method

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Abstract

Na-A zeolite (Z-S1) was synthesized from scoria found on Jeju Island, Korea using the fusion/hydrothermal method. The influences of NaOH/scoria ratio, SiO_2/Al_2O_3 molar ratio, and particle sizes on the synthesis of zeolite were studied by analyzing crystals morphology and crystallinity. According to XRD analysis, it was confirmed that the zeolitic materials were synthesized in the range of NaOH/Scoria ratio from 0.6 to 2.4. As the ratio of NaOH/Scoria increased from 0.6 to 1.2, the crystallinity of Z-S1 gradually increased from 8.85% to 57.53%, then became almost constant at 61.80% as the ratio of NaOH/Scoria exceeded 1.8. The particle size of the zeolite crystals tended to decrease with increasing the alkali content of NaOH/Scoria from 0.6 to 1.8. It was possible to synthesize tine crystals having the particle size about 1.0 ㎛ or less at a NaOH/Scoria ratio of 1.8. This study has shown that the fusion/hydrothermal method is a very effective technique for synthesizing Z-S1 from scoria and provides a potential application for obtaining commercial products from natural materials.

Keywords: Crystallization, Zeolite, Scoria, Fusion, Hydrothermal

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