



Synthesis of aluminum-substituted tobermorite and the application on the phosphorus removal from waste water

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ABSTRACT

An Al-substituted tobermorite was prepared by hydrothermal treatment using 4A-zeolite, sodium silicate, and calcium hydroxide. The X-ray diffraction (XRD) patterns and FT-TR spectra confirmed that tobermorite was formed after the hydrothermal process. The removal of phosphorous using the synthesized tobermorite was studied. XRD patterns, FT-TR spectra, and scanning electron microscope (SEM) images showed the formation of hydroxyapatite after *p*-elimination. It was found that the best solid/liquid ratio is 1.0 g/L and the best pH value is 9. Kinetic models and thermodynamic parameters of *p*-elimination were discussed, and the *p*-elimination process was proved to follow pseudo-second-order rate kinetics; it was spontaneous and endothermic.

Keywords: Phosphorous remove; Tobermorite; P-elimination process

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