



1-Synthesis of Faujasite from Egyptian Clays: Characterizations and Removal of Heavy Metals

Mohamed A. Moneim, Ezzat A. Ahmed

Abstract:

Abstract Three clay samples with different mineral compositions (kaolinite, smectite-kaoline, and smectite- rich) were used for zeolite synthesis using the method of hydrothermal reactions after fusion with NaOH. The conditions of hydrothermal crystallization (zeolitization) were found to be at temperature of 100°C, and time span between 72 h and 96 h for kaoline and smectite-rich samples, while 48 h for the smectite-kaolinite sample. The results indicate that zeolites began to crystallize from clay samples after 48 h, and crystallization increased with increasing time. The synthetic materials have been characterized by X-ray diffraction (XRD), scanning electron microscope (SEM), fourier transform infrared spectroscopy (FT-IR) and thermogravimetric (DTA/TGA) analysis. The results indicate that low silica NaX-faujasite type with well-developed octahedral and cubic crystals was synthesized from the three samples. No big difference in the characterization between the three synthetic materials was detected, but smectite-kaolinite sample as raw material was relatively better in crystallization of synthetic zeolite. Applications of the synthetic materials in the removal of heavy metals proved that the synthetic faujasite has strong effect for removing of Cr³⁺, Co²⁺, Ni²⁺ and Mn²⁺ from aqueous solution.

Keywords:

Keywords Faujasite, Kaoline, Smectite, Hydrothermal Reactions, Zeolite, Clay

Published In:

Geomaterials , 2015, 5, 68, 76 , 68 -76