THESIS

ORTHOPHOSPHATE ADSORPTION ON MORDENITE AND ITS CALCINATION EFFECT

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Mordenite (MOR), one type of natural zeolite, was used as adsorbent for orthophosphate removal in solutions. The aims of this study are to investigate the influence of calcination temperature, time, and initial orthophosphate concentration on the adsorption. For characterization, Brunauer-Emmett-Teller (BET), scanning electron microscope (SEM), energy dispersive X-ray spectrometer (EDS), X-ray diffractometer (XRD), and Fourier transform infrared spectrometer (FTIR) were used to investigate surface properties, composition, and structure of MOR. The results showed that the maximum orthophosphate adsorption happened after MOR was calcined at 750ºC. Adsorption coverage over the MOR surface was studied using two well-known isotherm models: Langmuir's and Freundlich's. The Langmuir adsorption isotherm was used to calculate the maximum phosphorus (P) adsorption capability of MOR. The result showed the highest P adsorption capability of 769.23 mg-P/Kg (R^2=0.8532). Atomic absorption spectrometer indicated the quantity of Ca^{2+} and Fe^{2+} dissolved from MOR in water, basic, and acidic solution. Zeta sizer was used to measure the zeta potential on MOR surface and study the adsorption behavior. The information on zeta potential showed that the calcined MOR at 750ºC had the increased amount of Al at the surface and had the high capability on orthophosphate adsorption which was agreed to the adsorption experiment.

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