

Zeolites Synthesis and Evaluation of the Phenol Adsorption in Aqueous Medium

Henrique Cesar Musetti^{1,2}, João Otávio Donizette Malafatti^{1,2}, Elaine Cristina Paris²

¹Universidade Federal de São Carlos, ²Embrapa Instrumentação Agropecuária - São Carlos

e-mail: henrikemusetti@gmail.com

Phenolic compounds are considered one of the most important organic pollutants released into the environment, causing unpleasant taste, odor to drinking water and organic disturbing in human beings. Between possible water treatment techniques, the adsorption by solid adsorbents appears as an effective method for the treatment and removal of organic contaminants in waste water treatment [1]. Thus, the objective of this study was to synthesize Faujasite Zeolites Y with Si/Al = 5 and evaluate their potential for phenol adsorption from aqueous solutions. Zeolites were obtained by sol-gel method [2], followed by hydrothermal process aged at 100°C for 6, 12 and 24 hours. The structural and morphological characteristics of the synthesized materials were investigated. The adsorption experiments were carried out using 50mL of phenol aqueous solutions (150ppm) in the presence of zeolite Y (1g/L) under stirring. Aliquots of the solutions were analyzed periodically by ultraviolet-visible spectrophotometry (320-220nm). According to the difratograms and electron microscopy images obtained of the synthesized materials, were produced Zeolite Y single phase when hydrothermal aging time was 6 and 12 hours. For hydrothermal treatment during 24 hours was observed the onset of a secondary zeolitic phase formation. The range of particle size was about 1-1,5µm and 1.5-2.0µm and the surface area of the material (BET) was 670m²/g and 573m²/g for zeolites hydrothermalized during 6 and 12 hours, respectively.

The phenol removal capacity in aqueous media by synthesized zeolites was approximately 5% (7.5 mg/g).

1. Ahmaruzzaman, M. *Advances in Colloid and Interface Science*, 143(1-2): p. 48-67, 2008.
2. Chaves, T.F. *et al.* *Microporous and Mesoporous Materials* 161, 67-75, 2012.