



Study of adsorptive removal of phenol by MOF-5

Kun Xie, Chunhui Shan, Junsheng Qi, Shu Qiao*, Qingshan Zeng, Liuyi Zhang

Key Laboratory of Water Environment Evolution and Pollution Control in Three Gorges Reservoir, Chongqing Three Gorges University, Wanzhou 404100, Chongqing, China

Tel. +86 23 58102256; Fax: +86 23 58102256; email: qiaoshu_76@163.com

Received 7 June 2013; Accepted 16 January 2014

ABSTRACT

Phenol adsorption experiments were conducted at constant temperature under oscillation conditions. The effects of the initial concentration of the aqueous phenol solution, temperature, adsorbent dosage, and initial pH of the solution on the removal rate were investigated. For an initial concentration of the aqueous phenol solution in the range 25–200 mg/L, a temperature of 40°C, a neutral solution, and a ratio of adsorbent/phenol in the range 40:1 to 2.5:1, the removal rate of phenol was 97% or more. The adsorption isotherm of phenol with MOF-5 followed the Langmuir and Freundlich models, with relative coefficients of 0.9855 and 0.9960, respectively. The adsorbent was recycled by soaking and washing with ethanol, and the recycled adsorbent gave good results after being reused six times.

Keywords: Metal–organic framework; MOF-5; Adsorption; Phenol

*Corresponding author.