



The feasibility of adopting zeolite in phosphorus removal from aqueous solutions

Yan Zhang*, Xiaoyan Kou, Hongsheng Lu, Xianjun Lv

College of Chemical and Environmental Engineering, Shandong University of Science and Technology, Qingdao 266590, China

Tel. +86 532 8605 7801; Fax: +86 532 8605 7106; email: hometownplant@163.com

Received 27 May 2012; Accepted 24 April 2013

ABSTRACT

Excess phosphorus in waterways can cause serious eutrophication, a phenomenon which could eventually result in water quality crisis. Thus, there is a need to seek appropriate ways to remove phosphorus from wastewater. This investigation evaluates the potential of two types of sorbents, granular zeolite (A) and globular zeolite (B), for phosphorus removal. The comparative adsorption of phosphorus from aqueous solutions by A and B is tested using batch experiments. For A and B, the assessed optimum pH is 1.8 and 2.0, sorbent dosage 2.5 and 30 g (per 100 ml aqueous solution, and the contact time intervals 20 and 40 min, respectively. The initial phosphorus concentration for both sorbents was 20 mg/L. The analysis of the results demonstrates that sorbent A has better adsorption characteristics than B. To describe the equilibrium adsorption isotherms, Langmuir and Freundlich models are applied to the data. The Langmuir isotherm adequately describes adsorption for both of these sorbents, with an R^2 goodness of fit of 0.9792 for A and 0.9835 for B, respectively.

Keywords: Phosphorus removal; Zeolite; Equilibrium isotherm

*Corresponding author.