



Adsorption properties of polyacrylamide/*Nicandra physaloides* (L.) gaertn gel to Congo red

Wenshuo Xu^a, Yanhui Li^{a,b,*}, Meixiu Li^b, Huimin Wang^a, Yong Sun^a, Mingfei Cui^a, Liubo Li^a

^aState Key Laboratory of Bio-fibers and Eco-textiles, College of Mechanical and Electrical Engineering, Qingdao University, Qingdao 266071, China, Tel. +86-532-85951842; email: liyanhui537@163.com (Y. Li)

^bCollege of Materials Science and Engineering, Qingdao University, 308 Ningxia Road, Qingdao 266071, China

Received 1 August 2021; Accepted 27 November 2021

ABSTRACT

In this paper, a facile freeze-drying method was used to prepare composites polyacrylamide/*Nicandra physaloides* (L.) gaertn seed gum (PAM/NPG), and it showed high adsorption properties to Congo red (CR) in the aqueous solution. The properties of the materials were investigated by scanning electron microscopy (SEM), Fourier-transform infrared spectroscopy, specific surface area analysis (BET) and thermogravimetric analysis. The adsorption properties of CR were investigated at different temperature, contact time, dosage of adsorption, pH, and initial concentration. The experimental results show that the maximum removal of CR from PAM/NPG aerogel is 684.931 mg/g when the temperature is 298 K and pH is 6. The pseudo-first-order kinetic model and Freundlich isothermal model are the best model to describe the adsorption behavior and the adsorption process is exothermic and spontaneous.

Keywords: Adsorption; Polyacrylamide; Congo red; *Nicandra physaloides* (L.) gaertn seed gum; Kinetic; Thermodynamic

* Corresponding author.