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Fabrication of porous zeolite/chitosan monoliths and their applications for drug release and metal ions adsorption

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Abstract

Ordered porous zeolite/chitosan (Zel/Chi) monoliths were prepared by a unidirectional freeze-drying method, and their properties and structures were characterized by various instrumental methods. The metal ion adsorption and the drug release performance of the porous Zel/Chi monoliths were also studied. The release rate of cefalexin from drug-loaded Zel/Chi monoliths depended on the composition and porous structure of the monoliths. The metal ion adsorption capacity of the Zel/Chi monoliths was related to the concentration of the metal ions, the adsorption time and the Zel/Chi ratio. An experimentally maximum adsorption of 89 mg/g was achieved for Cu²⁺ ions. The Zel/Chi monoliths with adsorbed Cu²⁺ ions effectively catalyzed the reduction of 4-nitrophenol to 4-aminophenol and had good recyclability. They were easily recovered by simply removing them from the reaction system and rinsing them with water.

Key words: zeolite, chitosan, porous material; adsorption; drug releasing

1. Introduction

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