

Kinetics Study on Water Treatment of Hg Metal by Adsorption-Fluidization with Chitosan-Urea as Adsorbent

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Abstract

Kinetics study of water treatment of Hg metal by adsorption fluidization methods using chitosan-urea as adsorbent has been conducted. Water contains of Hg metal (200 ml) was put into fluidization column and added 500 mg of chitosan-urea. The column was flowed by air at room temperature for 30, 60, 90, 120 minutes, respectively. The residue of Hg in solution was analyzed by AAS (*Atomic Adsorption Spectroscopy*). The data were analyzed using linier regression and obtained first-order equation with $\Delta G = 52.31 \text{ J mol}^{-1}$ and $\Delta H = -956.11 \text{ J K}^{-1} \text{ mol}^{-1}$

Key words: water treatment, Hg, adsorption-fluidization, chitosan-urea

1 Introduction

Mercury waste is very dangerous as environment pollution caused toxic to human and biological organisms. Derivates of thiourea and modified chitosan can be used as adsorbent for binding mercury metal ion (Choong *et al.*, (2005), Ashraf S. *et al.*, (2007), Lin Wang *et al.*, (2010). Modified of adsorbent can be increased the stability in acidic condition and the ability to adsorb of metal. In this present paper, we report the mercury can be adsorbed by chitosan-urea (Figure 1) using fluidization method to follow Langmuir isothermic equation and first-order kinetics adsorption.

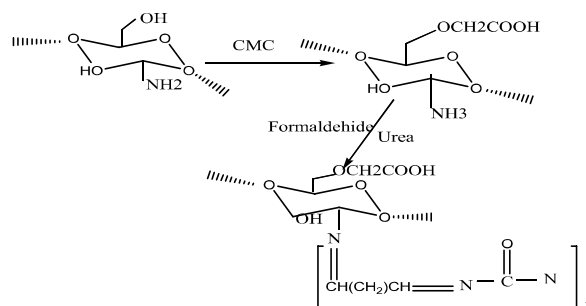


Fig 1 Molecular structure of chitosan-urea.

2 Methodology

Materials

The chitins of shrimps shells were collected on Maret 2011 in Sidoarjo, East of Java. The specimen was identified by Department of Biology, Faculty of Science and Technology, Airlangga University, Surabaya, Indonesia

Preparation of chitosan from chitin

Chitin was extracted via sequence of process, such as deproteination, demineralization, depigmentation and deacetylation.

Preparation of chitosan-urea