Thesis Title	Recovery of Nickel from Rinse Water of Electroplating Industry by Rice Husk
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Abstract

Nickel is a valuable heavy metal and generally used in the electroplating industry. Therefore, this research aimed to recover nickel from rinse water by a new adsorbent derived from rice husk, an abundant agricultural waste in Thailand. The results showed that the various rice husk capability for nickel adsorption was pretreated-alkaline rice husk > rice husk heated at 500°C > rice husk heated at 300°C > rice husk > pretreated-acid rice husk. The adsorption rapidly reached to equilibrium within 15 to 30 minutes. The ability also depended on the pH of adsorption system due to the increasing of the system pH resulted to higher nickel adsorption. SEM studies showed that the surface of both rice husk and pretreated-acid rice husk were compressed thus caused less surface. Whereas the swollen surfaces of pretreated-alkaline rice husk increase nickel adsorption. The functional groups involving in the nickel adsorption by rice husk and pretreated-alkaline rice husk were carboxylate, hydroxyl, aldehyde, siloxane and silanol. Whereas, the groups of rice husk heated at 500°C were only siloxane and silanol. Adsorption isotherms and elution test also indicated that the mechanism of nickel adsorption by rice husk involved physical and chemical adsorption. While the adsorption by both pretreated-alkaline rice husk and rice husk heated at 500°C were chemical adsorptions. In addition, the comparison of nickel adsorption efficiency showed that activated carbon still had higher adsorption capacity than pretreated-alkaline rice husk and rice husk heated at 500°C as 11.7, 8.1, and 5.5 mg/g adsorbent, respectively. However, pretreated-alkaline rice husk was more feasible to be used to recovery of nickel from rinse water from the electroplating industry in a column system.