

Preparation of Carbonaceous Sulfur-impregnated Adsorbent from Rice Straw for Nickel Recovery from Nickelplating Waste Solution

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A novel carbonaceous adsorbent for the recovery of nickel from nickel-plating waste solution was prepared from rice straw using sulfur impregnation. Rice straws were cut to 1-cm pieces and were immersed in 1 M K_2S solution to prepare sulfur-immersed materials. The immersed materials were heated at 100-700°C in nitrogen gas to produce sulfur-impregnated carbonaceous adsorbent by pyrolysis. The carbon and sulfur contents in the adsorbent and the adsorbent ability to recover nickel from aqueous solution were examined. Product prepared from material that was immersed in 1 M K_2S solution via pyrolysis at 400°C indicates a maximum recovery for nickel ions. The product can adsorb nickel ions that coexist with phosphorus and other ions from nickel-plating waste solution, and the adsorbed nickel was deposited as nickel metal after heating at 1000°C in nitrogen.

Keywords : Rice straw, Sulfur-impregnated adsorbent, Pyrolysis, Nickel recovery, Nickel-plating waste solution