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COMPARISON STUDIES OF RAW AND OXIDIZED MULTI-WALLED CARBON NANOTUBES H_2SO_4/HNO_3 TO REMOVE *p*-NITROANILINE FROM AQUEOUS SOLUTION

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The raw and oxidized multi-walled carbon nanotubes mixed with H_2SO_4/HNO_3 were used to remove PNA from aqueous solutions. Heat recovery using nanotubes was performed in two stages. The effective factors on PNA removal were studied. The adsorption isotherms and kinetic reactions were determined. Optimal conditions for a real solution of petrochemical wastewater were performed to evaluate the PNA adsorption. The maximum removal efficiencies of PNA by raw and oxidized carbon nanotubes was obtained at optimal conditions. The equilibrium adsorption capacity is dependent on the amount of adsorbent and also the initial concentration of material that will be adsorbed. The process of adsorption followed second order kinetic and Langmuir isotherm. This is a good adsorbent in PNA removal from aqueous solution. It also can recover in several stages.

Keywords: adsorption, aqueous solution, multi-walled carbon nanotubes, *p*-nitroaniline.

Introduction

The aromatic compounds such as *p*-nitroaniline (PNA) are common pollutants in wastewater of oil refinery, petrochemical industry, manufacturing of pesticides, paint and chemical industries [1].

PNA is one of the aniline derivatives used as an important compound to synthesize the organic substances, Azo paints, disinfectants agents and

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