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KINETIC AND EQUILIBRIUM STUDIES OF FLUORIDE ADSORPTION BY A CARBONACEOUS MATERIAL FROM PYROLYSIS OF WASTE SLUDGE

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The efficiency of the adsorption for fluoride by sludge from the treatment of starch industry wastewater was investigated. Batch experiments were conducted in order to determine the parameters that affect the adsorption process. The activation for waste sludge and specific surface area and porosity effects in enhancing the pyrolysis conditions were determined. The adsorption parameters of initial fluoride concentration, pH and adsorbent dosage were investigated with carbonaceous material. As a result of pyrolysis of samples treated with $ZnCl_2$ 1196 m^2/g, the specific surface area was reached. Correlation coefficient of 0.99 and 12.75 mg/g adsorption capacity and adsorption isotherm model were revealed as convenient. Experimental results show that the adsorption of fluoride waste sludge will be effective in many ways in which the adsorbent is applied.

Keywords: adsorption, adsorption isotherm, waste sludge, fluoride.

Introduction

As a result of water solubility of the minerals in the soil, Ca, Mg, Na, K, Li and NH_4 as cation and SO_4, PO_4, NO_3, F and Cl as anion are available in natural waters. Living things need these minerals to carry out their vital activities. However, the high concentration of anions and cations present in the aquatic environment has negative effects. Fluoride is found in the form of fluorite and fluorapatite in the earth's crust. Fluoride concentrations range from 0.01 to 0.3 ppm in fresh water and 1.2 to 1.5 ppm in oceans. However, there are low concentrations in drinking water and foods. In particular, fluoride emissions are spread into the environment during industrial activities used inorganic and organic fluorine compounds [1]. Major sources of fluoride in the environment are the food, pharmaceutical, cosmetics, glass and ceramics industry, electroplating coating applications, steel and aluminium, rubber, pesticides, fertilizers and semi-con-

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