Ain Shams University
Faculty of Science
Chemistry Department

Treatment of Industrial Wastewater from Some Industries Discharging in Ismailia Canal in Qalubia Governorate

Thesis

Submitted for Partial Fulfillment of the Requirements for The Degree of Ph.D, in Inorganic Chemistry

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DEDICATION

I dedicate my dissertation work to my family and many friends. A special feeling of gratitude to my loving ***Father*** *(God have mercy on him), my* ***Mother****, and my* ***Mother in Law*** *whose words of encouragement and push for tenacity ring in my ears.*

I also dedicate this dissertation to my loving husband ***Kamal*** *for his help and support and for giving me a worm environment to study.*

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ACCEPTED PAPER

Removing Heavy Metals from Industrial Wastewater Using Cement Kiln Dust and Electric Arc Furnace Dust as Industrial By-Products

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Abstract

The River Nile and its branches are the main source of fresh water in Egypt. They are subjected to all pollution sources, among and most important of it is the industrial one. This study aims to investigate removal efficiency of industrial wastewater discharged to Ismailia Canal using cement kiln Dust (CKD) and electric arc furnace dust (EAFD) as industrial adsorbents. Some heavy metals such as; iron, manganese, aluminum, nickel, and zinc have been studied. The adsorption process is examined in terms of its equilibria and kinetics. Batch adsorption experiments are performed to evaluate the removal of these metals onto CKD and EAFD by-product wastes under various operational conditions such as; adsorbate ions concentration, contact time, pH, adsorbent dose, and temperature. The results revealed that CKD has a very high affinity to adsorb iron, manganese, nickel, and zinc ions. While, EAFD can efficiently adsorb only manganese, aluminum and nickel. The adsorption isotherms and kinetic studies indicated that the adsorptive behavior of heavy metals ions on CKD and EAFD satisfy the Langmuir assumptions, i.e. monolayer formation on the surface of the adsorbent, and obeys the pseudo-second-order equation reaction.

Keywords

Heavy Metals Treatment, Cement Kiln Dust, Electric Arc Furnace Dust, Ismailia Canal, Adsorption and Langmuir Isotherm.

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