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COMPARATIVE HEAVY METALS AND DYES REMOVAL EFFICIENCY ON FLY ASH AND WOOD ASH

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Abstract

Ash is a waste that can be an efficient substrate in wastewater treatment for the immobilization of heavy metals and for dyes removal. For an up-scalable wastewater treatment process, efficient substrates, with relatively constant behavior are needed and modifying the adsorbent surface can be a feasible solution. Fly ash, resulted from coal burning, and wood ash are mixtures mainly containing metal oxides and carbon in various proportion, depending on the initial raw material.

The paper presents a comparative study of heavy metals and dyes on modified fly ash and wood ash powders; washed ash was tested as adsorption substrate for cadmium and methylene blue removal from single and mixed solutions. The adsorption efficiency and kinetic, the substrate capacities and the mechanisms are further discussed correlated with the crystalline structure (XRD) and morphology (AFM). The results show that ash with controlled surface properties allows the simultaneous removal of heavy metals and dyes, resulting waters that respect the discharge regulations. They tend to adsorb in a competitive process and modify the substrate.

Key words: adsorptions, dye, fly ash, heavy metal, wastewater treatment, wood ash

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