

STUDY OF EFFECT OF ULTRASOUND AND MICROWAVE EXPOSURE ON SORPTION CHARACTERISTICS OF COAL-CONTAINING COMPOSITES

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Karaganda region is an industrial center with great amount of major power plants, coal plants, metallurgy and chemical plants and this fact causes high water pollution level. Treatment of coal and metallurgy industry plants waste water becomes more and more current issue in the region. In this connection works are conducted on production of cheap and effective sorption reagents on the basis of coal-mining waste.

Thermal destruction is known to be a traditional method of advanced coal processing. Disadvantage of such method is losses of considerable part of carbon caused by burnout effect and impossibility to control process in order to achieve projected in advance characteristics of coal derived materials.

Therefore, development of new and nontraditional technologies for coal processing and modification is a current issue. Ultrasound and microwave exposure belongs to such technologies which enable us to avoid mentioned shortcomings and considerably influence speed and direction of reactions, giving possibility to modify composition and greatly improving sorption and other characteristics of composites.

Institute of organic synthesis and coal chemistry conducted study of sorption characteristics of coal-containing samples in regard to metal ions using model solution, consisting of five metal salts: iron, cobalt, nickel, copper and zinc, having with overall concentration 0,04 N. Tests were performed using Shubarkol deposit coal, processed with the help of hydrogen peroxide, nitric and sulfuric acid under ultrasound and microwave exposure. Quantitative metal content tests of original and treated waste water were conducted in the certified "EcoNus" LLP laboratory with the help of atomic emission spectrometer with Inductively Coupled Plasma. Produced samples show high level of sorption properties in regard to metal ions (especially Fe²⁺ and Cu²⁺) and can be recommended as cheap and effective sorbents for waste water and polluted soil treatment.