INTERACTION OF BROWN COAL WITH ISOPROPANOL IN A MICROWAVE FIELD

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Modified coal is a potential source of high-quality crude mountain wax. We investigated the effect of microwave treatment on the interaction of brown coal of the isopropyl alcohol in the presence of \textit{p}-toluensulfonate (0.01 mole) as catalyst. Conditions of alkylation treatment: the reaction time in the microwave field was limited in all cases to 1 hour; the weight of the coal was 5 g; amount of the catalyst was 0.01 mole, and the amount of alcohol was 50 ml. Microwave exposure was carried out on the device brand LG-MS2022G (2.45 GHz). After alkylation, the solid residue was subjected to extraction treatment with a benzene carrier and a mixture of 2-propanol-benzene (1:1). The extractive bitumen’s obtained were fractionated with sulfuric ether into waxes and ethers. The group composition of waxes was investigated by alkaline hydrolysis with 5\% alcohol solution of potassium hydroxide, separating the saponification products in a similar way. Chromato-mass-spectrometric (CMS) analysis of alkylated products was carried on an Agilent Technologies 7890A.

It is established that the most optim al conditions for the process are: irradiation power of 150-300W, catalyst amount of 0.01 mole. As the data of CMS analysis, under these conditions the tar content on the resulting bitumen is reduced to a minimum (from 1.38\% in the initial to 0.33\% in the modified bitumen).

The use of microwave irradiation increase the bituminous product an average of 1.5–2 times than traditional technology. An increase microwave irradiation power above 500 W leads to an increase in resinous substances in the recovered bitumen.

According to CMS benzene extract of wax substances contains oxygen-containing hydrocarbons (esters) (26.2\%), aromatic hydrocarbons (33.9\%) and alkanes (29.4\%). The heptan extract contains mainly paraffinic hydrocarbons (53.1\%), and hexane extracts it is found oxygen-containing (51.0\%) and paraffinic (45.8\%) hydrocarbons.