**Investigation on the catalytic activity of the red mud – industrial waste – in different model reactions**

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The utilization of the red mud available in significant amounts is an important issue from environmental point of view and also from the reasonable use of the natural resources. During the past decades about 55 million tons of red mud accumulated at different storages sites in Hungary. The red mud is a caustic material having pH=11-13. Thus its storage exhibits potential threats to the environment, flora, fauna and human beings. Nowadays research is focused on the elaboration of an economically feasible solution for the utilization of the red mud with the use of other industrial/agricultural wastes. The red mud is a mixture of metal oxides/metals such as Fe2O3, Al2O3, ZnO, MgO,Ti, Ni, Ga etc. and rare earth metals which have important catalytic features. Therefore it is expected that the red mud can be utilized after pretreatment as a cheap catalyst for chemical processes such as hydrocracking of heavier hydrocarbons, hydrodealkylation of aromatics compounds, etc.

The experimental data support the notion that the red mud exhibits catalytic activity in the hydrocracking reaction of hexadecane, hydro-dealkylation reactions of toluene and ethyl-benzene. The results showed that the red mud exhibited the highest catalytic activity after acidic and thermal treatments, in which cases the conversion of hexadecane to hydrocarbons (having carbon number between C1-C15) was about 80% ; conversion of the toluene to benzene was about 20% and conversion of the ethyl-benzene hydro-dealkylation was about 58 %. The catalytic activity of the red mud samples were correlated with morphological and surface chemistry data. The acidic treatment on the one hand increases the number of active sites and on other hand increases the surface area, on which the chemical transformation of hydrocarbons, the hydrocracking /hydrogenation takes place, thus increases the product yields of the studied reaction.

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