

PERFLUOROBUTANESULFONIC ACID AND OTHER FLUORINE-FREE ACIDS AS
BRONSTED CATALYSTS IN ALKYLATION REACTIONS

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Perfluorobutanesulfonic acid and other fluorine-free Bronsted acids (phosphoric acid, methanesulfonic acid, *p*-toluenesulfonic acid) are compared with regard their catalytic performance in alkylation reactions involving oxygen-containing alkylating agents (alcohols, ethers, esters, ketones). Reactions were carried out using benzene or toluene as an aromatic substrate; in any case experimental data emphasized the very high catalyzing ability of perfluorobutanesulfonic acid in comparison with the other experimented acids.

In particular, in the alkylation of benzene *iso*-butyl ether, *iso*-butyl alcohol, *n*-butyl alcohol and *tert*-butyl alcohol were used as alkylating agents; *tert*-butylbenzene was always the main reaction product. Perfluorobutanesulfonic acid only, compared with phosphoric acid and methanesulfonic acid, gives complete conversion of the alkylating agent and shows the highest reaction rate.

In the alkylation of toluene di-*iso*-butyl and methyl-*tert*-butyl ether, *iso*-propyl alcohol, ethyl acetate and acetone were used as alkylating agents. Either reactivity or yield were always higher with perfluorobutanesulfonic acid in comparison with the other used acids. Acetone experimented as an alkylating agent led to a surprising result because of the formation of unexpected *p*-*tert*-butyltoluene as a sole reaction product.

Experimental results are described.