

EFFECTIVE TWO-PHASE SYSTEM FOR IONIC HYDROGENATION

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The main results on studying ionic hydrogenation reactions have been obtained using the system $\text{CF}_3\text{COOH-R}_3\text{SiH}$ [1]. It was found by us that conducting hydrogenation with trialkylsilane in a two-phase system consisting of equal volumes of 65% HClO_4 and CHCl_3 led to a high yield of products (Table 1).

The selectivity of ionic hydrogenation is retained in the indicated system. Unbranched olefins are not hydrogenated, aromatic ketones are reduced to the corresponding hydrocarbons. Shortening of the reaction time to 10 min reduced the yield of products only insignificantly. Hydrogenation did not proceed at a concentration of HClO_4 less than 60%.

The effectiveness of the system is evidently caused by the combination of high acidity ($\text{H}_0 = -6.6$), by the presence of a superweak nucleophile ClO_4^- , and solvent exerting a favorable influence on the course of the reaction with participation of carbene ions.

TABLE 1. Substrate: $\text{Et}_3\text{SiH} = 1:1.2$ (molar); $\text{CH}_2\text{Cl}_2:65\%$ $\text{HClO}_4 = 1:1$ (by vol.); 20°C ; 30 min

Substrate	Hydrogenation product	Yield, %	Substrate	Hydrogenation product	Yield, %
1-Methylcyclohexene	Methylcyclohexane	97	Acetophenone	Ethylbenzene	74
2,3-Dimethyl-2-butene	2,3-Dimethylbutane	83	Cyclohexene	Cyclohexane	0
2-Methyl-2-decene	2-Methyldecane	100			

LITERATURE CITED

1. D. N. Kursanov, Z. N. Parnes, M. I. Kalinkin, and N. M. Loim, Ionic Hydrogenation [in Russian], Khimiya, Moscow (1979).

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