

HYDROGENATION OF MULTIPLE BONDS USING ISOPROPYL ALCOHOL
WITHOUT A CATALYST

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UDC 542.941.4:541.571.3

It is taken for granted that the presence of a catalyst such as aluminum isopropylate in the Meerwein-Ponndorf-Verley reaction [1] is necessary for reductions with isopropyl alcohol.

It was discovered by us that in the supercritical state isopropyl alcohol is an agent which hydrogenates multiple bonds of various types without the use of catalysts. In typical experiments isopropyl alcohol (23 g) and anthracene (1 g) were packed into a steel autoclave of capacity 40 ml and were maintained at 410°C for 80 min. After distilling off the solvent, crystallizing, and sublimating, 9,10-dihydroanthracene was isolated in 80% yield. Acetone was determined chromatographically in the solvent in amounts corresponding to the stoichiometry of the reaction. Under analogous conditions benzyl alcohol was formed in 95% yield from benzaldehyde and hexane from 1-hexene in 50% yield. On extended heating of benzaldehyde with isopropyl alcohol under subcritical conditions (210°C) only small amounts (<3%) of benzyl alcohol were formed.

To exclude the influence of the autoclave walls an experiment was carried out with benzaldehyde in a glass ampul under the same conditions. Benzyl alcohol was detected in the reaction products in the same yield.

The found reaction has been applied in the hydrogenation of a wide circle of unsaturated compounds.

LITERATURE CITED

1. F. Keri and R. Sandberg, In-Depth Course of Organic Chemistry [in Russian], Khimiya, Moscow (1981), Vol. 2, p. 130.

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