HYDROGENATION OF HETEROCYCLIC COMPLEXLY BONDED COMPOUNDS

A. D. Pomogailo, D. V. Sokol'skii,
T. A. Yagudeev, I. D. Leonov,
U. Sh. Shunkarov, and T. G. Sarbaev

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In a study of the hydrogenation of aromatic heterocyclic compounds we found that hydrogen does not add to the pyridine ring (the catalyst was Raney nickel containing 12% molybdenum). The latter may be a consequence of the strong chemisorption of the compound being hydrogenated with the active catalyst centers due to the unshared pair of electrons of the N atom, on the one hand, and the stability of the system of π electrons in the unstrained pyridine heterocycle, on the other. Both limitations can be avoided if the approach of Kargin and Kabanov [1,2] is used; they used it successfully to polymerize such compounds, while we used it successfully to copolymerize them with α-olefins [3].

The method consists essentially in complexing of these compounds with inorganic salts or, as an extreme case of complexing, in converting them to Menschutkin salts. Simultaneously with avoiding the inhibiting action of the heteroatom, the multiple bonds in the ring are activated, which creates the possibility for its hydrogenation at a comparatively high rate. Thus the conversion of pyridine to ethylpyridinium bromide promotes its smooth hydrogenation to form ethylpiperidinium bromide.

The special possibilities of this method are manifested in the hydrogenation of heterocycles which have exocyclic multiple carbon-carbon bonds (particularly vinylpyridines). In this case there is also simultaneous activation of the exocyclic $C=C$ bond and its hydrogenation at a higher rate than in the absence of a complexing agent, and saturation of the bonds in the ring occurs after its exhaustive hydrogenation. Thus 2-methyl-5-ethylpiperidinium ethylbromide was obtained in quantitative yield by the hydrogenation of 2-methyl-5-vinylpyridinium ethylbromide. These quaternary salts are decomposed and the hydrogenation products are isolated in the usual way.

LITERATURE CITED

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