



Soviet-era science, translated into English

CHEMISTRY

Academician A. V. TOPCHIEV and V. L. VAISER

1958

SovietRxiv

View the original and related papers at <https://sovietrxiv.org/items/ru-195801.13593>

Source: Math-Net.Ru and CyberLeninka. Machine translation. Verify with the original.

Abstract

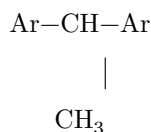
Full Text

CHEMISTRY

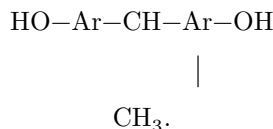
Academician A. V. TOPCHIEV and V. L. VAISER

HYDROGENATION OF CERTAIN UNSYMMETRICAL DIARYLETHANES

In studies (¹⁻⁵) on the alkylation with acetylene of toluene, isopropylbenzene, diisopropylbenzene, phenol, cresol, and β -naphthol using the catalyst $H_3PO_4 \cdot BF_3$, individual compounds were obtained—diarylethanes of the general formula

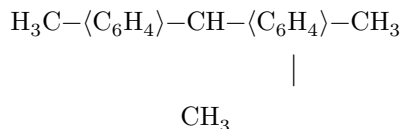


or oxydiarylethanes



We subjected these compounds to hydrogenation in an apparatus of the Musaev—Gal' pern system at elevated temperatures and pressure, with an industrial catalyst, Ni on kieselguhr.

Hydrogenation of ethyleneditolyl (EDT)

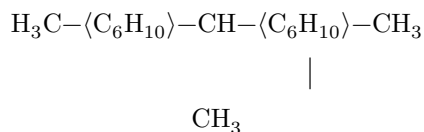


Into the autoclave were placed 20 g of EDT and 5 g of catalyst; the temperature was 250—300° and the pressure 100—150 atm.

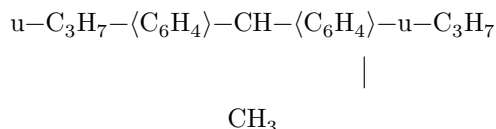
After 8 hours the product was drained from the autoclave, filtered, washed with alkali and water, dried with calcium chloride, and distilled under vacuum. A clear oily liquid was obtained, b.p. 108—110°/2 mm, d_4^{20} 0.8502, n_D^{20} 1.4800.

Molecular weight found 216; calculated for $C_{16}H_{30}$ 222. MR_D found 72.8, calculated 71.7.

The compound may be identified as 1,1-(4,4-dimethyl)di-cyclohexylethane

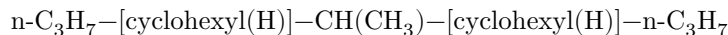


Hydrogenation of ethylidenediisopropylbenzene

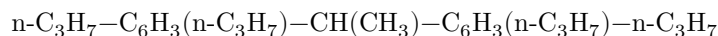


It was carried out under conditions analogous to the hydrogenation of EDT. The product obtained was an oily clear liquid, b.p. 160—162°/4 mm, d_4^{20} 0.8989, n_D^{20} 1.4898. Viscosity at 50° 20.4 cs, at 100° 3.9 cs. Molecular weight found 275; 279; calculated for $C_{20}H_{38}$ 278. MR_D found 90.0; calculated 90.2.

The compound may be identified as 1,1-(4,4'-diisopropyl)dicyclohexylethane

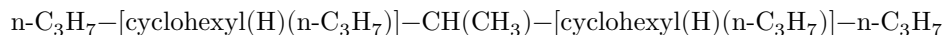


Hydrogenation of ethylidenediisopropylbenzene



As a result of hydrogenation under conditions analogous to the preceding ones, a product was obtained—a clear viscous liquid, b.p. 177-179°/1 mm, n_D^{20} 1.4980. Molecular weight found 356; calculated for $C_{26}H_{50}$ 362.

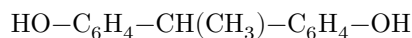
The compound may be identified as 1,1-(2,2',4,4'-tetraisopropyl)dicyclohexylethane



structural formula

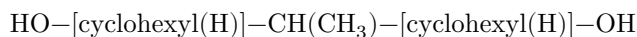
Figure 1: structural formula

Hydrogenation of phenol alkylate

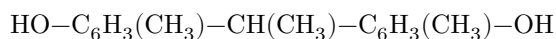


It was carried out at a temperature of 280°, pressure of 100 atm, with Ni on kieselguhr catalyst in an amount of 20% of the alkylate; the solvent was *n*-heptane. Hydrogenation was continued for 10 hours until a negative test for the formalite reaction was obtained. The purified product—the hydrogenate—was a clear viscous liquid: n_D^{20} 1.5065, d_4^{20} 1.007, b.p. 160-165°/6 mm. Molecular weight found 236; 232; calculated for $\text{C}_{14}\text{H}_{26}\text{O}_2$ 226.

MR_D found 66.5; calculated 65.5. The compound may be identified as 1,1-(4,4'-dioxo)dicyclohexylethane

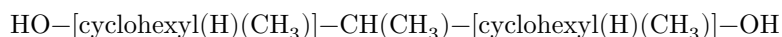


Hydrogenation of ethylidene-di-*o*-cresol



was carried out in the same way as for the phenol alkylate. A clear viscous liquid was obtained. B.p. 160-165°/3 mm, n_D^{20} 1.4815, d_4^{20} 0.9620. Molecular weight found 260; calculated for $\text{C}_{16}\text{H}_{30}\text{O}_2$ 254. MR_D found 75.5; calculated 74.8.

The compound may be identified as 1,1-(4,4'-dioxo-3,3'-dimethyl)dicyclohexylethane



Hydrogenation of β -Naphthol Alkylate

Hydrogenation was carried out under conditions analogous to the preceding ones. A transparent viscous liquid was obtained. B.p. 178-179°/1 mm, n_D^{20} 1.5151, d_4^{20} 0.9800. Molecular weight: found 308; 302; calculated for $\text{C}_{22}\text{H}_{24}\text{O}$, 304. MR_D : found 92.5; calculated 91.6.

The resulting hydrocompound may be identified as di(tetrahydronaphtho)pyran:

The hydrocompounds obtained for the first time by this method may serve as a basis for an in-depth theoretical and practical study of the hydrogenation reaction of diarylethanes.

Moscow Petroleum Institute
named after I. M. Gubkin

Received
29 V 1958

References

1. V. L. Vaiser, DAN, **87**, No. 4 (1952).
2. V. L. Vaiser, A. M. Polikarpova, DAN, **84**, No. 1 (1952).
3. V. L. Vaiser, DAN, **103**, No. 5 (1955).
4. V. L. Vaiser, A. M. Polikarpova, DAN, **108**, No. 3 (1956).
5. V. L. Vaiser, DAN, **115**, No. 1 (1957).

Note: Figure translations are in progress. See original paper for figures.

Source: Math-Net.Ru and CyberLeninka. Machine translation. Verify with the original.