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LETTER TO THE COORDINATOR OF SPECIAL PROBLEMS OF CHEMICAL PRODUCTION

SUBJECT: TRIPTANE

Experimental work has been in progress for some time on triptane and similar hydrocarbons.

One group of investigators is concerned with the Grignard synthesis for the manufacture of triptane using organo-magnesium compounds. Tertiary butylchloride is used as starting material and this is converted to tertiary butyl magnesium chloride by means of magnesium in ether solution. After decomposition of the metal-organic compound with water and acid an ether solution of trimethylbutanol is obtained. Trimethylbutanol is separated from the ether, dehydrated to trimethylbutene and subsequently hydrogenated to trimethylbutane.

The yield of triptane is about 30%. By-products consist of lower-boiling hydrocarbons (isobutane, isobutylene) and higher-boiling hydrocarbons, including tetramethylbutane.

Tertiary butylchloride can be obtained by the chlorination of butane and by the addition of hydrochloric acid to isobutylene. This approach would appear to be very expensive for large-scale production since a plant for the manufacture of the magnesium would be necessary besides the unit for the manufacture of tertiary butylchloride from butane or butylene and their further processing.

The other group of workers is studying the reaction of propylchloride and isobutane with elimination of hydrochloric acid. This method leads to branched heptanes which should have especially high octane numbers. The experiments so far have shown that it is certainly possible by this method to obtain a product with the knock value of technical iso-octane. It appears, however, also possible to obtain triptane which has been produced in the United States and which has a knock value exceeding that of iso-octane. The chlorination of propane or propylene to propylchloride could be carried out in the projected plant for the manufacture of isopropylether or chlorobutane. The cost of the latter type of reaction using isobutane should, according to all predictions, be less than that for a plant using the Grignard synthesis.