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The ethylbenzene which is formed undergoes further destructive hydrogenation.

As indicated above, the exptl. studies of the pyrolysis of ethylbenzene and of isopropylbenzene lead to the conclusion that it is the rupture of the C-C bond in the side chain, and not of the $C_{arom} - C_{aliph}$ bond, which constitutes the first step in the process of thermal decomposition of these hydrocarbons. This is confirmed by data on bond dissociation energies. According to the calculations of N. N. Semenova /11/, the dissociation energy of the C-C bond in $C_6H_5-CH_3$ is equal to 87.5 kcal/mole, and that of the C-C bonds in is equal to 84.6 kcal/mole. The dissociation energy of the C-C bonds in the side chains of alkylbenzenes is significantly smaller, about 57.5-65.0 kcal/mole.

Let us now consider our exptl. data.

Our investigation which was carried out under autoclave conditions at 475° and at working pressures up to 680 atm (initial hydrogen pressures of 50-300 atm) showed the overall conversion of isopropylbenzene was accelerated with increasing hydrogen pressure. Thus, after three hours this conversion was 71% at 300 atm working pressure, about 80% at 390 atm and about 90% at 670 atm. The composition of the liquid reaction products undergoes a very substantial change. When the duration of the expt. was three hours, and the working pressure was 180-220 atm, the benzene content of the reaction products corresponded to 8-9 wt. % of the isopropylbenzene initially charges^d; at 300 atm, it was 20-22%; at 670 atm it was 46-49%. The toluene contents under these conditions were, respectively,