Rearrangement of 1,2,3-Triphenylcyclopropene to 1,2-Diphenylindene catalyzed by Di-μ-chlorodichlorobis(ethylene)diplatinum(II)

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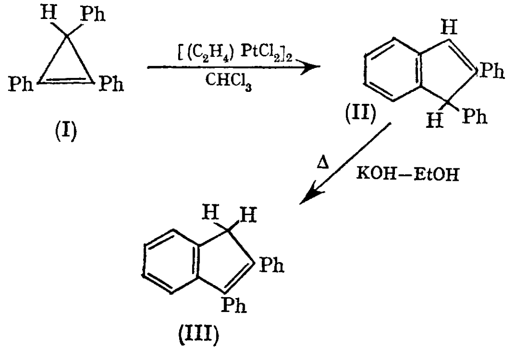
IN an attempt to displace ethylene from $[(C_2H_4)PtCl_2]_2$ by 1,2,3-triphenylcyclopropene (I), we found that the principal product of the reaction was the known 1,2-diphenylindene (II), formed by the rearrangement of (I). The reaction was carried out as follows. A chloroform solution of (I) and the Pt^{II}-complex were mixed and left at room temperature for 0·5 hr; the solution was then chromatographed on neutral alumina and eluted with chloroform. The first material collected was a white solid (II) which crystallized from ethanol (m.p. 178°, lit.[1] 177°) and was identified by its conversion to 2,3-diphenylindene (III), m.p. 108°.[1] The n.m.r. spectra of (II) and (III) were in agreement with the reported spectra.[2] The second material isolated from the chromatography was an orange solid which crystallized from pentane and decomposed on heating at *ca.* 150°. It has not yet been characterized, but is believed to be the Pt^{II}-complex which is an intermediate in the rearrangement.

That the reaction is catalytic was shown by combining 0·11 g. of (I) with 0·01 g. of the Pt^{II}-dimer (molar ratio of 24 : 1) in 2 ml. of chloroform, and monitoring the disappearance, due to unchanged (I), of the sharp singlet in the n.m.r. spectrum at τ 6·68. After 13 hr. at room temperature, all of (I) had disappeared while under reflux, (I) disappeared within 1 hr. The formation of (II) was observed by following an n.m.r. peak which appeared at τ 6·1, and grew at the expense of the τ 6·68 peak. In the absence of the Pt^{II}-complex no conversion occurred.

Although the acid-catalyzed rearrangement[3] of (I) to (II) and the thermal rearrangement of arylcyclopropenes to indenes[4] have been reported, we believe this to be the first such transition-metal catalyzed reaction to be reported.



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