THE FIRST PLATINUM-CATALYZED HYDROSILYLATION WITH SUPPORTED PLATINUM CATALYSTS

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This reaction was first carried out at the Linde Laboratory of Union Carbide in 1945 and patented in 1946. Pt on asbestos or charcoal were the first catalyst choices, with trichlorosilane and ethylene the standard reactants, and a shaking pressure vessel (monel) the container. Using this setup, we tried many additional olefins, with success. Only acrylonitril refused to react. Several SiH compounds—SiH_2Cl_2, $SiH(OEt)_3$, $C_2H_5SiHCl_2$, $CH_2=CHSiHCl_2$, and others—reacted successfully. Acetylene diluted with nitrogen gave both $CH_2=CHSiCl_3$ and $Cl_3SiCH_2CH_2SiCl_3$. High surface area (~500m^2) gamma alumina supported Pt was the most effective. As little as 0.1 mg Pt on this support converted 300 ml of standard reactants, $CH_2=CH_2$ and $SiHCl_3$, in 0.8 hr. to $C_2H_5SiCl_3$. Without Pt supported catalysts, olefins and SiH compounds reacted at 300°C or higher; with the catalysts, the reaction temperature was 100-200°C lower. A new polymer with a $(-CH_2CH\underset{|}{\overset{|}{S}}i-)$ chain was made from $CH_2=CHSiHCl_2$. Mr. P.W. Shafer and Mr. W. G. Whitehead were my capable assistants during this research.