Ammonium salts as catalysts for a trimerization of 1,6-hexamethylene diisocyanate

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Trimerization of diisocyanate is important step of polyurethane production since the trimer shows better properties than diisocyanate monomer. In this study, ammonium salts are used as a catalyst for trimerization of 1,6-hexamethylene diisocyanate(HDI). One of the commercial catalysts, TMR-2, is quenched by impurities in HDI which were incorporated during the thermal cracking of urethanes. However, ammonium salts bearing a hydroxide ion are found active irrespective of the presence of impurities in HDI. Also, hydroxyl group on the cation interacts with anion, so that the reactivity of catalyst can be controlled. Heavily hindered alcohol such as t-amyl alcohol or t-butanol for mixing HDI and catalyst greatly depress the formation of side products, urethanes. Ammonium salts bearing benzyl group on the cation can be dissolved in t-amyl alcohol and t-butanol.