

A<sub>3</sub>COMPARATIVE STUDY OF Cr<sub>2</sub>O<sub>3</sub>/Al<sub>2</sub>O<sub>3</sub> AND Cr<sub>2</sub>O<sub>3</sub>/C CATALYSTS FOR ISOMERIZATION AND DISMUTATION OF CHLOROFLUOROETHANES

D. Bechadergue, M. Blanchard and P. Canesson\*

Université de Poitiers, U.A. C.N.R.S. 350, Catalyse en Chimie Organique, 40, Avenue du Recteur Pineau, 86022 Poitiers (France)

Dismutation and isomerization of trichlorotrifluoroethanes have been investigated on Cr<sub>2</sub>O<sub>3</sub> based catalysts which are used for industrial fluorination of chlorofluoroethanes by hydrogen fluoride. With catalysts deposited on active charcoal, transformation of CCl<sub>2</sub>F-CClF<sub>2</sub> shows a rapid dismutation into the other halocarbons and a slow isomerization into CCl<sub>3</sub>-CF<sub>3</sub>. The reaction starts very sharply when the catalyst temperature is increased by 10°C above 320°C, and then the composition of the products at the reactor exit does not change until 400°C. The observed reaction corresponds to successive dismutations and the relative reactivity of each possible chlorofluoroethane has been determined. If the active Cr<sub>2</sub>O<sub>3</sub> phase is deposited on alumina, the same reactions are observed but at temperatures 100°C lower than for the Cr<sub>2</sub>O<sub>3</sub>/C catalysts. With this support, the ratio of CCl<sub>3</sub>-CF<sub>3</sub> in the reaction products is more than twice that observed with charcoal, demonstrating that direct isomerization is a major reaction on alumina-based catalysts. Kinetic studies with mixtures of the two trichlorotrifluoroethanes have shown that the dismutation reaction is bimolecular and a reaction mechanism is proposed that allows an explanation of the experimental results.

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