

Methylene chloride oxidation over alumina supported chromium oxide-based catalysts

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Methylene chloride oxidation has been studied at 150–500°C, 1.0 bar and space velocity of 12000⁻¹ over several supported chromium oxide-based catalysts. Effects of various chromium loadings, different supports, reaction conditions were investigated in an attempt to select an optimum catalyst for the reaction. Chromium oxides of different loadings ranging from 5 to 15 wt% on γ -Al₂O₃ were tested. At 350°C 10 wt% loading exhibited methylene chloride conversion of 99%. γ -Al₂O₃ containing high surface areas gave the best performance when MgO, TiO₂, SiO₂ and γ -Al₂O₃ were tested as supports. Effects of reaction temperatures and feed compositions were also evaluated on a 10 wt% CrO_x/ γ -Al₂O₃ catalyst. Catalysts were characterized by BET surface area, X-ray diffraction (XRD), X-ray photoelectron spectroscopy (XPS) which confirmed the presence of both Cr³⁺ and Cr⁶⁺ in the calcined catalyst. The formation of well dispersed Cr⁶⁺ active reaction sites for methylene chloride oxidation, play an important role in performances.