Characteristics of V_2O_5-TiO_2 aerogel catalysts for oxidative destruction of 1,2-dichlorobenzene

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Chemically homogeneous V_2O_5-TiO_2 aerogels prepared by sol-gel method and supercritical drying were used for the catalytic oxidation of chlorinated aromatic compounds. The synthesized aerogels showed catalytically favorable properties which are high specific surface area, well developed mesoporous structure and nanosized particles. Any XRD peaks for vanadia crystalline were not observed because of the inherent chemical homogeneity of the sol-gel synthesis. Surface Vanadia mainly with its highest oxidation state of 5+ from XPS is believed to act as a effective oxidizer. With various vanadia contents, TPR indicated that strong interaction with titania maintained up to 10% of loading and multiple chemical structures of surface vanadate were observed through Raman spectroscopy. Monovanadate and polyvanadate as well as anatase crystalline structure of titania were considered to play a major role in the catalytic oxidation of 1,2-dichlorobenzene.