Gas phase oxidation of 1,2-dichlorobenzene on V_2O_5/TiO_2 and MnO_x/TiO_2 aerogel catalysts

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The gas phase oxidation of 1,2-dichlorobenzene(DCB) was performed in the presence of 20% of oxygen and 80% of nitrogen on titania supported vanadia and manganesia aerogel catalysts prepared by sol-gel method and supercritical drying. The reaction was conducted in a fixed bed reactor with a residence time of less than 0.02 seconds in the range of 150-600℃. V_2O_5/TiO_2 and MnO_x/TiO_2 catalysts showed not only a destruction efficiency of more than 99% at above 500℃, but also no deactivation after 24 hours reaction. Moreover, different from other metal oxide such as chromia, no volatile chlorinated metal oxides were produced. The major products of CO and CO_2 were also monitored during the reaction to compare the actual efficiency of total oxidation. V_2O_5/TiO_2 showed higher destructive activity at lower temperatures and on the other hand MnO_x/TiO_2 showed better performance for complete oxidation. The highest activities were obtained at 10% loadings of both V_2O_5 and MnO_x.