289ag Synthesis and Characterization of Vanadia-Titania Aerogel Catalysts

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Vanadia-titania composite aerogels prepared by sol-gel process and supercritical drying were tested as catalysts for complete oxidation of 1,2-dichlorobenzene and ammoxidation of m-xylene. The catalytic properties were measured by nitrogen adsorption-desorption, TEM, XRD, TPR, and Raman spectroscopy. Catalytic reactions were carried out in a fixed-bed flow reactor in a temperature range of 150-600C and 100-400C for complete oxidation and ammoxidation, respectively. Aerogel catalysts exhibited excellent catalytic performances for both reactions in comparison with conventionally impregnated catalysts. Conversions were higher than 98% at above 400C with a vanadia loading of 10wt% for oxidative destruction of 1,2-dichlorobenzene. For ammoxidation of m-xylene, a maximum isophthalonitrile (IPN) yield of 78% was obtained at 325C. Surface vanadates and TiO2 anantase phase were the crucial factors to obtain high catalytic activities.