

Direct gas phase epoxidation of propylene over Au/Ti-SBA-1

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Cubic *Pm3n* mesoporous Ti-incorporated silica with 1-5 mol % Ti content have been prepared by co-condensation method and gold clusters were deposited on these supports by deposition precipitation (DP) method. These materials were characterized by XRD patterns, N₂ adsorption-desorption isotherms, UV-Vis spectra and TEM. All samples have cubic *Pm3n* structure and high surface areas. The studies by UV-Vis spectra indicated that the Ti(IV) in the catalysts with low Ti content was favorably in tetrahedral (T_d) coordination, whereas for the catalysts with Ti/Si molar ratio above 5 %, a larger amount of Ti(IV) was in octahedral coordination. TEM images showed that the average particle size is larger than 3 nm as actual gold loadings is above 1 wt%.

The catalytic results showed the catalyst with low actual gold loadings (< 1 wt%) which is more selective to PO, while at high gold loadings (> 1 wt%), the catalyst showed lower PO selectivity. In propylene epoxidation with H₂ and O₂, 7.4 % propene conversion and > 90 % PO selectivity were achieved over 10Au³⁺/3Ti catalyst.

Keywords: cubic *Pm3n*, mesoporous, Ti -SBA-1; propylene epoxidation, gold, zeolite seed

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