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Oxidation of Ethane over Silicomolybdc Acid Catalysts: Catalytic Activity for Homogeneous and Heterogeneous Pathways

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Ethane oxidation was examined over silica supported silicomolybdc acid (SMA) catalysts under conditions described as excellent for partial oxidation to investigate the catalytic activities in the presence of non-catalytic ethane oxidation. When water vapor was absent or limited, SMA was transformed to the α -MoO₃ phase, C₂H₆ conversion was enhanced, and the major products were C₂H₄ and CO, whereas little HCHO was formed. However, the selectivity for HCHO was improved by the addition of excess water vapor. The acidity of SMA, which was stabilized by water vapor as β -MoO₃, might catalyze the scission of the C-C bond, so partial oxidation to HCHO could be promoted in preference to oxidation to CH₃CHO. In addition, the formation of the MoO₂ phase, which was observed in the co-presence of C₂H₆ and water vapor, suggested that the lattice oxygen participated in the activation and oxidation of C₂H₆.

Keywords: [Ethane oxidation](#), [Silicomolybdc acid](#), [Molybdenum oxide catalyst](#), [Ethylene](#), [Aldehyde](#)

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