

Catalytic Combustion of Methane over Co/Mo and Co/Mn Catalysts at Low Temperature

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Abstract : Natural gas (the main constituent is Methane 95%) is considered as an alternative to petroleum for the production of synthetics fuels. Nowadays, methane combustion at low temperature has received much attention however; it is the most difficult hydrocarbon to be combusted. Co/Mo and (4:1 wt/wt) catalysts were prepared from a range of different precursors and used for the low temperature total methane oxidation (TMO). The catalysts were characterized by, XRD, BET and H₂-TPR and tested under reaction temperatures of 250-400 °C with a GHSV= 36,000 mL g⁻¹ h⁻¹. It was found that the combustion temperature was dependent on the type of the precursor, and that those containing chloride led to catalysts with lower activity. The optimum catalyst was Co/Mo (4:1wt/wt) where greater than 20% methane conversion was observed at 250 °C. This catalyst showed a high degree of stability for TMO, showing no deactivation during 50 hours of time on stream.

Keywords : methane low temperature total oxidation, oxygen carrier, Co/Mo, Co/Mn

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