Abstract

Extensive studies on the mechanism of the partial oxidation of Methane have been carried out using a transient response analysis of a broadened pulse combined with either a step change or a sharp isotopic pulses. When reaction occurred over the unreduced NiO/ SiO2 catalyst, the reaction between methane and oxygen occurred. Methane in the gas phase (or weakly adsorbed) reacting with Oxygen in the adsorbed state. Over the reduced NiO/SiO2 catalyst, the reaction take place by a Langmuir- Hinshelwood mechanism. Methane and oxygen reacting in the adsorbed states . It has been established that isotopic pulses of 18O2 revealed that over the reduced catalyst lattice oxygen is formed and reduced by the carbon species ; thus, on the reduced catalyst a dynamic redox process occurred.

Keywords: Isotopic Pulses, gas phase, broadened Pulse; transient response analysis , adsorbed states.