

The Partial Oxidation of Methane to Methanol with Nitrite and Nitrate Melts

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The effect of reduced oxygen species on the partial oxidation of methane to methanol was examined with nitrite melts. The experimental results support the suggestion that the formation of methanol or C₂ compounds depends on different reduced oxygen species, as observed in our previous work using nitrate melts. It has been suggested that the partial oxidation of methane proceeds to CH₃OH or C₂ compounds via parallel pathways. This suggestion was verified by increasing the oxygen concentration to carry out the partial oxidation of methane in 25 mol% NaNO₃ - 75 mol% KNO₃ melts. A methanol selectivity of 8.2% and a methanol yield of 0.43% were observed with CH₄/O₂ = 15/1 at 575 °C, whereas with CH₄/O₂ = 7/1 methanol selectivity and yield increased to 23.7% and 1.1%, respectively. The results further confirm the contribution of the superoxide ion O₂⁻ on methanol formation.

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