$Na_2WO_4/Mn/Mg/Ti/SiO_y$ mixed oxide catalysts for oxidative coupling of methane

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A vast number of catalytic materials have been studied for the oxidative coupling of methane (OCM) reaction to achieve high selectivity of C_2 products at high methane conversion in order to make an approved for industrial application. In this study, $Na_2WO_4/Mn/Mg_x/Ti_{0.05}/Si_{1-(x+0.05)}O_y$ mixed oxide-supported catalysts through one-pot synthesis were prepared to develop favorable mixed oxide properties as feasible component to determine the OCM performance and process efficiency. The reaction was performed in high temperature (750-850 °C) to obtain high C_2 yield, and the catalyst consisting $Na_2WO_4/Mn/Mg_{0.05}/Ti_{0.05}/Si_{0.90}O_y$ exhibited the highest C_2 yield (19.3% at 775 °C and 23.1% at 800 °C). The specific compounds of Na, W, and Mn play important role for highly active OCM catalyst. The addition of Mg into $Na_2WO_4/Mn/Ti_{0.05}/Si_{0.95}O_y$ increased the concentration and dispersion of Mn at the catalyst surface to improve OCM performance.