

## STUDY OF CARBON DIOXIDE – METHANE REACTION USING CO- AND CA- PROMOTED $MnO/\gamma-Al_2O_3$ CATALYSTS

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**Abstract:** *The performance of Co-MnO/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> and Ca-MnO/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> catalysts in the carbon dioxide-methane reaction to produce syngas and C<sub>2</sub>-hydrocarbons has been reported. The most promising Ca- and Co-containing catalysts were characterized by using X-ray Diffraction (XRD), Nitrogen Adsorption (NA) and Scanning Electron Microscopy (SEM). The catalysts were tested in a fixed-bed quartz reactor at atmospheric pressure, 800 °C and methane to carbon dioxide ratio of unity for five hours. The 5 wt.% Ca-12 wt.% MnO/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> catalyst was found to be the most stable against coking while 5 wt.% Co-12 wt.% MnO/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> was more suitable to produce syngas (H<sub>2</sub> and CO). Both catalysts showed low activities toward C<sub>2</sub> formation.*

**Keywords:** Carbon dioxide-methane reaction; C<sub>2</sub>-hydrocarbons; Coking; MnO;  $\gamma$ -Al<sub>2</sub>O<sub>3</sub>

**Abstrak:** *Prestasi mangkin Co-MnO/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> dan Ca-MnO/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> semasa tindak balas karbon-dioksida-metana bagi menghasilkan singas dan C<sub>2</sub>-hidrokarbon telah dilaporkan. Mangkin mengandungi Ca- dan Co- yang terwibawa telah dicirikan dengan pembelauan sinar-X (XRD), penyerapan nitrogen (NA) dan mikroskopi elektron pengimbas (SEM). Mangkin-mangkin itu telah diuji di dalam reaktor kuartza padatan tetap pada tekanan atmosfera, 800 °C dan nisbah metana kepada karbon dioksida = 1 selama lima jam. Mangkin 5 wt.% Ca-12 wt.% MnO/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> telah didapati paling tahan pengkokan manakala mangkin 5 wt.% Co-12 wt.% MnO/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> adalah lebih sesuai untuk penghasilan singas (H<sub>2</sub> and CO). Kedua-dua mangkin menunjukkan keaktifan rendah terhadap pembentuk C<sub>2</sub>.*

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