

EPFL Valais/Wallis SEMINAR

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Experimental Investigation into the Effect of CO₂ on the Oxidative Conversion of Methane

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Abstract: Carbon dioxide is a waste product of oxidative coupling of methane (OCM) reaction but it is also an indispensable constituent in the origins of the methane reserves. It is crucial to comprehend the effects of carbon dioxide in oxidative coupling of methane, considering that both methane and carbon dioxide are greenhouse gasses and the separation or purification techniques are highly costly and energy-intensive. However, only few studies on co-fed CO₂ in OCM have been conducted so far, all using different conditions and catalysts, and no consensus exists. To shed more light on this debate, this work analyzes the effect of CO₂ in the OCM process at different conditions and with the two most promising catalysts: La-Sr/CaO and NaMnW/SiO₂. It is found that up to 7% of CO₂ in the feed over La-Sr/CaO catalyst, no significant decrease in the CH₄ conversion, O₂ conversion and C₂ selectivity is detected whereas for NaMnW/SiO₂ this threshold prolonged for 20% of CO₂. The catalysts composed of basic oxides have been found to be more active in OCM but at the same time more sensitive to the presence of large volumes of CO₂. Comprehending the effects of CO₂ on OCM will lead an opportunity to the utilization of carbon dioxide and methane into ethylene production.

Keywords: oxidative coupling of methane, carbon dioxide utilization, catalyst characterization, carbonates, basicity, catalytic performance



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Born in 1995 and is from Turkey. Yasemen Kuddusi graduated with a B.Sc. in Chemical Engineering as being the 1st ranked student from Istanbul Technical University in 2019. Then, in the same year, she started her M.Sc. in Chemical Engineering in Ghent University fully funded with the Master Mind Scholarship. Her master thesis is mentored by Prof. dr. ir. Joris Thybaut and is entitled as "Experimental Investigation into the Effect of CO₂ on the Oxidative Conversion of Methane". She will obtain her M.Sc. in Chemical Engineering degree in June 2021.