

# CO<sub>2</sub> methanation over Ni/Al hydrotalcite-derived catalyst: Experimental characterization and kinetic study

## Authors

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## Description

The catalytic performance of a Ni/Al hydrotalcite derived catalyst for CO<sub>2</sub> methanation was analysed under different operating conditions. The as synthesized sample has been characterized through atomic adsorption spectroscopy (AAS) X-ray diffraction (XRD), Brunauer-Emmett-Teller (BET) analysis, temperature programmed reduction (TPR) and CO chemisorption. Experimental investigation was carried out at atmospheric pressure by varying the reactor bed temperature (within the range 270–390 °C), the H<sub>2</sub>/CO<sub>2</sub> feed ratio and the reactant flow rate. The impact of methanation products on the reaction rate was also analysed by co-feeding reactants with steam and methane. Stability tests were also performed, showing a good catalytic performance of the hydrotalcite-derived catalyst over time. Different kinetic rate expressions were then developed starting from experimental results. Power law, power law with an