with added CO_2 in order to achieve a stoichiometric ratio of H_2/CO_2=4:1 for the Sabatier reaction ("Sabatier-mixture").
As catalyst for methanation, we use nickel catalysts supported on SiO_2/Al_2O_3 ceramics. The CO_2 conversion reaches nearly 100% at 260° in nickel-based catalysts. The selectivity towards methane is near 100% for synthetic COG and remains at this high level for COG with additional CO_2. When the inlet gas composition is adjusted to get a Sabatier-ratio of H_2/CO_2=4:1, the CO_2 conversion reaches 90% at 300°C. This opens opportunities for the application of cheap catalysts for either COG refinement or a reuse of CO_2 from combustion processes in power plants, steel production, or cement industry.

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