

## Further developments in heterogeneous catalyzed ethanol synthesis

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Fraunhofer ICT develops a novel process for the heterogeneous catalyzed synthesis of ethanol from CO<sub>2</sub> and H<sub>2</sub>. The selection and interaction of the process conditions and the catalyst material represent the key elements to be able to operate an economically feasible CO<sub>2</sub> chemistry despite the thermodynamic stability of CO<sub>2</sub> and the C-C coupling barrier. We are collaborating with universities to produce, test and optimize catalysts for this process. While including thermodynamical calculations and basic quantum chemistry during this work, the focus of this abstract are new scientific findings and experimental results. Selected promoters on the surface and the choice of reaction parameters (pressure, temperature, CO<sub>2</sub>/ H<sub>2</sub> ratio) cause C-C coupling to be favored over thermodynamically preferred methane formation. Utilization of CO<sub>2</sub> for the ethanol production represents a significant step towards sustainable chemistry.