

## Synthesis of Ethanol from CO<sub>2</sub> and H<sub>2</sub>

While the synthesis of methanol from CO<sub>2</sub> is already on a near-industrial scale, the production of ethanol is still challenging. Fraunhofer ICT is developing a new process for the gas phase catalysis of ethanol from CO<sub>2</sub> and H<sub>2</sub>. A mechanism known and applied mainly for oxidation reactions shall be now adopted to the hydrogenation reaction required for ethanol synthesis. 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. In intensive cooperation with universities, these catalysts are produced, characterized and tested with regard to a successful synthesis of ethanol. Ethanol is a very valuable basic chemical. It can be used, for example, as solvent, as starting material for the production of many other chemicals, as a fuel additive or for the synthesis of eFuels.