

## Co-electrolysis of Carbon Dioxide and Water in a Pressurized Electrolyser

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This work describes an application of carbon dioxide utilization, namely co-electrolysis of CO<sub>2</sub> and water powered by renewable energies to produce syngas. This electrochemical conversion is carried out near room temperature and at pressures higher than atmospheric pressure (>10 bar). Syngas is a versatile building block that can be used to produce other fuels such as hydrogen, methane, gasoline, alcohols and other chemical products. This green syngas can be used as a platform for sustainable processes in the chemical industry.

The two compartment pressurized electrolyser and electrochemical system is briefly described. The influence of different type of membranes on productivities, faradaic efficiencies and cell potentials are reported. The advantages of the use of ionic liquid-based electrolytes for simultaneous CO<sub>2</sub> capture and conversion, and the results of development work of such type of electrolytes are presented.

The role of different electrode materials and on the performance of the electrochemical system is analysed.