

Abstract for March 2022 conference in Cologne

The SPOCC Reactor is an electrochemical device which combines CO₂ with methane and air at elevated temperature to produce syngas. No external energy is required as the reactions are self-sustaining at temperature. The syngas can be converted to a huge range of fuels and chemicals.

CO₂ is a source of carbon, energy is needed to convert it into useful chemicals. Typically this is either done by using an energetic molecule such as hydrogen, or by electrolysis. For the latter to be sustainable it obviously requires the use of renewal electricity, but the problem is that huge amounts of electricity is required to deal with the current levels of CO₂ emissions.

The SPOCC Reactor needs a supply of both CO₂ and methane. An anaerobic digester produces the perfect mix of these two molecules. Using organic waste as the raw material, this represents a sustainable route to organic chemical production.

Methane is the second most important greenhouse gas after carbon dioxide. With the decomposition of methane hydrates, its importance may increase. Ultimately the raw materials for the SPOCC Reactor may come from direct air capture of both carbon dioxide and methane.