CO_2 capture and utilization pave the way towards a climate neutral cement production

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Cement producers contribute to 7-8% of global CO_2 emissions, making them significant players in the upcoming climate transition. While Carbon Capture and Storage (CCS) is crucial for a short-term solution, Carbon Capture and Utilization (CCU) assumes a circular economy and thus has a more pivotal role in the long run. Consequently, Rohrdorfer aims to take a pioneering role in advancing and scaling up CO_2 electrolysis and CO_2 capture technologies. To this end, two pilot plants have been constructed and have been operational since October 2022 - one dedicated to CO_2 capture (2 tons per day) and the other to CO_2 electrolysis (1 kg per hour).

The goal is to illustrate the entire process, starting from capturing CO_2 in the flue gas to producing value-added products such as formic acid or ethylene. In pursuit of this objective, a third pilot plant dedicated to converting CO_2 into ethylene is scheduled for construction in January 2024. This initiative builds upon insights gained from the cell concept, periphery adjustments, and the scale-up of the CO_2 electrolyzer for formic acid production.

For both CO_2 electrolyzer setups, we have devised unique configurations to achieve high conversion efficiencies and current densities. Simultaneously, these configurations contribute to reducing downstream processing costs and energy inputs. Formic acid and ethylene possess substantial market demand and offer the potential for long-term carbon storage, a crucial aspect for addressing unavoidable (geogenic) CO_2. This makes them compelling products in the conversion of CO_2 from cement flue gas.