

Application 2068



Investigation to the feasibility of MCFC as CCS technology

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The objective of the proposal project is to investigate the feasibility of MCFC as CCS technology:

The experimental campaign should be focused on the evaluation of the effects of SO₂ addition in the cathode stream on cell performance including the integrated reformer catalysts. This topic is of great interest regarding the possible integration of a MCFC system used as an active technology for CO₂ separation from flue gas from traditional power plants. These gases have different compositions and usually they contain sulphur dioxide. It is expected that SO₂ in the oxidant stream will react inside the MCFC and migrate to the anode in ionic form, where it will affect the hydrogen oxidation mechanisms and internal methane reformer catalyst.

The experimental campaign shall be structured as follows:

- MCFC single cell start up procedure and stabilization,
- After stabilization of the cell 1 ppm of SO₂ shall be introduced in the cathodic stream for 1000 hours,
- During poisoning periodical performance characterization tests shall be carried out (I-V curves, EIS spectra, gas chromatographic analysis),
- Test shall be terminated after 1000 hours and post mortem analysis shall be performed (SEM, EDX, XRD) on both cell components and anode-side reformer catalyst.

Results coming from this test will be of crucial relevance to understand the behaviour of SO₂ poisoning, the feasible range of operating conditions and consequently the real potential of the MCFC as an active CCS technology.

The expected duration of the requested Access will be of 2 months, including benchmarking, 1000-hour test and post-test characterization.