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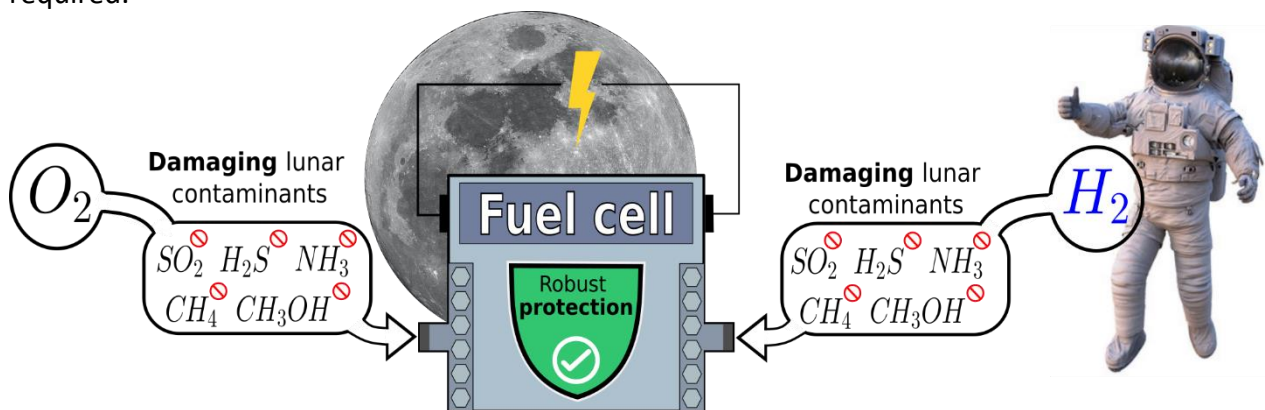
Stremayrgasse 9, 8010 Graz

A paid Master's Thesis

is available in the Gollas Group:

Fabrication of robust fuel cells for a lunar outpost

Context: Space agencies from all around the world are planning to send humans back to the moon and beyond. However, this time the goal is to construct a crewed outpost on the lunar surface which keeps operational without the need for earth-bound deliveries by utilizing materials found in situ (ISRU – In-situ resource utilization). To ensure energy supply and storage of such a remote outpost, fuel cells in combination with electrolyzers could be employed. Excess energy is used to split **lunar water** to hydrogen and oxygen, which is transformed back to water and electricity if needed. Yet lunar water is contaminated with large amounts of sulphides, ammonia, and other contaminants which destroy the electrolyser and fuel cell systems. Hence, highly robust fuel cell and electrolyser systems which are optimized for lunar conditions are required.



Objective: Electrospinning, which is a method to produce fibres in the nanometre regime, has recently been used to manufacture robust and high-performance fuel cell electrodes. The aim of this thesis is to build upon these advances and fabricate as well as characterize electrospun nanofiber fuel cell electrodes. The work includes:

- Optimization of electrospinning catalyst ink
- Investigation of nanofiber morphology with electron microscopy
- Cell assembly and electrochemical characterization

The scientific work will be conducted in cooperation with the European Space Agency (ESA) and the Institute of Chemical Engineering and Environmental Technology (CEET).

Requirements: Bachelor's in Chemistry, Materials Science, Chemical Engineering, or similar

Start of the work: As soon as possible