

Faculty Name:

Daniel Esposito

Faculty Email:

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Lab:

Solar Fuels Engineering Lab

Project Title:

Membraneless electrolyzers for CO₂ conversion

Description:

This project will involve the design and development of novel membraneless electrochemical devices for converting CO₂ into chemicals and fuels. These electrolyzers are very important for a clean energy future because they can use electricity generated by renewable solar or wind resources to produce storable chemical fuels such as hydrogen. This project will be primarily experimental in nature, focusing on the design of devices, fabrication of devices, and evaluation of their performance. Conventional electrolyzers rely on membranes, which are costly and can be prone to failure. The project aims to develop new electrolyzers based on flow-through electrodes that do not require membranes and apply them in a way that allows for stable, high throughput conversion of CO₂ to chemicals. 3D printing, or additive manufacturing, will be used to fabricate the electrolyzers. Electroanalytical techniques and in situ high speed video analysis will be employed to evaluate device performance under different operating conditions and electrode configurations, and reactor design principles will be applied to optimize electrode and reactor geometries. This project will require previous experience with programming and computer-aided design software, as well as coursework in fluid dynamics.

Location of Research:

On-Site

of hrs/week:

35

Department/Program:

Chemical Engineering

Eligibility:

MS

To apply, please contact:

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