

**Faculty Name:**

Daniel Esposito

**Faculty Email:**

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**Lab:**

Solar Fuels Engineering Lab

**Project Title:**

Synthesis and process development of encapsulated electrocatalyst materials

**Description:**

This project is based on investigating the changes in properties and performance of encapsulated electrocatalysts under different processing conditions. Learnings from these encapsulated electrocatalysts will be translated to photocatalytic particles for hydrogen production from water splitting. Photocatalytic water splitting with suspension reactors is an attractive way to produce clean energy because they can be used to directly use sunlight to convert low energy reactants such as water into energy dense and storable chemical fuels such as hydrogen. This project will be primarily experimental in nature, focusing on modifying processing conditions of ultrathin overlayers, such as annealing or precursor composition, which can enhance catalyst durability, increase activity, and improve selectivity by blocking undesirable back reactions. Research will also involve the use of advanced materials characterization tools, and analysis of the performance of the fabricated electrodes using a variety of electroanalytical tools.

**Location of Research:**

On-Site

**# of hrs/week:**

35

**Department/Program:**

Chemical Engineering

**Eligibility:**

BS, First Year, BS, Second Year

**To apply, please contact:**

de2300@columbia.edu