New Carbon Dioxide Absorbent Material

VTIP 19-018: "VPI-100-M: A Metal Organic Framework for Carbon Dioxide Utilization and Conversion"

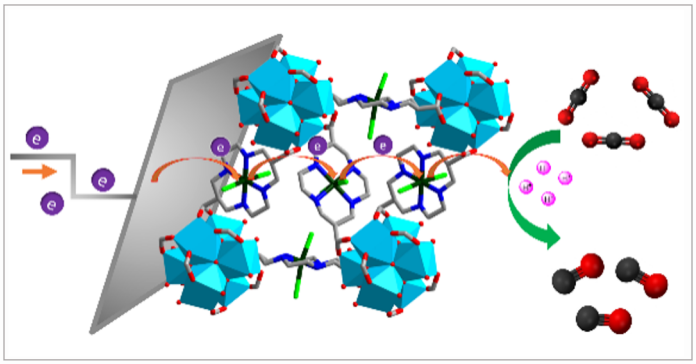
THE CHALLENGE

Concerns of global warming have been growing over the last decade. One of the driving forces of these concerns is the amount of carbon dioxide in the atmosphere. It allows more heat into the atmosphere than most other particles while also remaining in the atmosphere for a very long time. Due to this, methods for absorbing and utilizing carbon dioxide are necessary for reducing the potential damage of the already emitted gasses.

Example of an application where this new class of materials could be used for CO2 absorption.

OUR SOLUTION

Amanda Morris and her team at the Department of Chemistry have developed a new class of high crystalline porous materials named VPI-100-M. It can be used as an efficient CO2 adsorbent, as well as a catalyst for CO2 chemical transformations. With the presence of a co-catalyst, the VPI-100-M can convert CO2 and epoxide to cyclic carbonates under mild conditions. This material is very promising for carbon sequestration. Additional potential uses of this technology include commercial electrolyzers and artificial photosynthetic arrays. Overall, the VPI-100-M can serve as highly stable and reusable heterogeneous catalysts for transforming CO2 into useful chemicals.



VPI-100-Ni integrated with a conductive substrate to achieve a functional CO2 electrochemical reduction system.

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