

Flexible metal-organic frameworks (flexMOFs) are emerging as a revolutionary class of materials that could transform the way we manage gases. Unlike traditional rigid porous materials, flexMOFs can undergo structural changes in response to gases or vapors, making them highly efficient for a range of applications.

Our project focuses on a special type of flexMOF that incorporates thiazole-thiazolate structures. Some of these frameworks exhibit continuous transformations during gas adsorption, a behavior we aim to thoroughly understand. By investigating the underlying mechanisms—both thermodynamic and kinetic—we hope to uncover how these transformations occur and the role of host-guest interactions.

Our key goals include improving the selectivity, response time, capacity, and overall efficiency of these materials. We believe that flexMOFs with continuous "breathing" capabilities offer a more energy-efficient and cost-effective solution for separating and storing various hydrocarbons (like ethylene, acetylene, propane, and butane) compared to their rigid counterparts. Ultimately, this research could lead to significant breakthroughs in the field of porous materials, paving the way for advanced technologies in gas separation and storage.