Topology Guided Design and Syntheses of Stable Mesoporous MOFs with High Surface Area

Scientific Achievement
A series of isoreticular porphyrinic MOFs with ftw-a topology were synthesized using the extended porphyrinic linkers, and the high connectivity of the Zr$_6$ cluster yields frameworks with enhanced stability despite high porosity and ultra-large linker.

Significance and Impact
Provides insights on how to control the symmetry and direction of nodes in modulating the building units to obtain the desired structure.

Research Details
- For topological design of MOFs, the final structure are determined by not only the connectivity and symmetry of nodes, but also the direction and relative position between each node.
- Guided by topology and symmetry, porphyrinic linkers were extended with desired conformation by arranging the vicinal phenyl ring and carboxylate group.
- Through combination of the extended organic linkers and twelve connected Zr$_6$ cluster, a series of stable mesoporous porphyrinic zirconium MOFs were synthesized.


Work was performed at Texas A&M university