Highly Stable Porphyrinic Zr-MOFs for CO₂ Fixation

Scientific Achievement
A serious of highly stable porphyrinic Zr-MOFs constructed from six-connected Zr₆ cluster were synthesized.

Significance and Impact
Broadens the diversity of Zr-MOFs. Especially provides a stable platform for the porphyrin chemistry including catalysis, light harvesting, sensing and etc.

Research Details
– A series of porphyrinic Zr-MOF(PCN-224) constructed from six-connected Zr₆ building block was synthesized through ligand elimination.
– PCN-224 exhibits the highest BET surface area of 2600m²/g among all the reported porphyrinic MOFs.
– PCN-224 also shows very high stability in aqueous solutions with a wide range of pH values.
– Particularly, PCN-224(Co) can be reused as heterogeneous catalyst for CO₂/propylene oxide coupling reaction.

Dawei Feng, Wan-Chun Chung, Zhangwen Wei, Zhi-Yuan Gu, Hai-Long Jiang, Ying-Pin Chen, Donald J. Darensbourg, and Hong-Cai Zhou. J. Am. Chem. Soc. 2013, 135, 17105. Work was performed at Texas A&M University