Porous Organic Molecular Materials for CO₂ Capture Applications

Jian Tian and Praveen K. Thallapally
Energy and Environment Directorate, Pacific Northwest National Laboratory, Richland, WA 99352

Summary and future work

Porous organic molecular materials are still rare compared to those network materials, such as organic network polymers and metal-organic frameworks (MOFs). Assembly of organic host molecules into channel-forming structures is intriguing not only from the perspective of crystal engineering but also for its great potential in CO₂ capture and separation applications. We have demonstrated that certain organic molecules could be engineered into porous crystalline solids with 0-D voids or 1-D nanochannels by means of crystal engineering, which have shown highly selective CO₂ uptake. We also reveal that amorphous solids of organic cage molecules are inherently porous. Future work will be focused on developing porous organic molecular materials with very high BET surface area and CO₂ storage capacities.

Acknowledgements

We are grateful to the DOE office of science and office of fossil energy for providing financial support for this research. Part of this research is from my PhD work at University of Missouri in collaboration with Dr. Praveen K. Thallapally.

References: