Flexible Metal-Organic Frameworks for Hydrogen Isotope Separation

Hoi Ri Moon

Department of Chemistry, Ulsan National Institute of Science and Technology, Ulsan, Korea, Republic of (South Korea); hoirimoon@unist.ac.kr

Rational and creative design of organic and metal building blocks has successfully enabled the genesis of a variety of coordination polymers or metal-organic frameworks (MOFs) that are of fundamental scientific importance as well as provide a myriad of practical applications including gas storage and separation, catalysis, and sensing. One of the most attractive features in MOFs is flexibility because they show distinctive properties that cannot be achieved with rigid MOFs and other porous inorganic materials. In this talk, we will present strategies that exploit flexible MOFs for effectively separating hydrogen isotopes through the dynamic pore change of flexible MOFs. Especially, a unique isotope-responsive breathing transition of the flexible MOF was studied, which selectively recognize and respond to only D_2 molecules through a secondary breathing transition, monitored by in situ neutron diffraction experiments.

Keywords: Metal-organic framework, Flexibility, Isotope Separation