

Recent Progress in the Development of Metal-organic Frameworks for Hydrogen Isotopes Separation

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Highly pure deuterium is an irreplaceable raw material for both industrial and scientific research, thus, the isolation of deuterium from nearly physicochemically identical isotopic mixtures is an important challenge in modern separation technology. However, current commercial approaches suffer from extremely low separation efficiency, requiring a cost-effective and large-scale separation technique.

Alternatively, hydrogen isotope mixtures can be separated either by confinement in small pores or strong adsorption sites through quantum effect. Metal-organic Frameworks(MOFs) are excellent candidates for study of these quantum effect in confined system, due to their well-defined, tunable pore structures and the ability to functionalize the sorption site internal space of MOFs. In this talk, the recent status of hydrogen isotope separation using MOFs, and future strategies will be outlined based on the experimental results obtained by various analytical techniques.