Scientific Achievement

Pulsed-field gradient NMR was used to study the decrease in imbibed solvent self-diffusion in MOF-5 (Zn$_2$O(BDC)$_3$) variants with increasing substitution of NH$_2$-BDC$^{2-}$ for BDC$^{2-}$.

Significance and Impact

For eight solvents with different polarity, the decrease in self-diffusion between MOF-5 and Zn$_2$O(NH$_2$-BDC)$_3$ (IRMOF-3) was similar, indicating that pore size—not solvent–linker interactions—most influences self-diffusion. This observation has relevance to the design of other mixed-linker MOFs for practical applications.

Research Details

– 17 MTV MOFs were prepared with varying NH$_2$-BDC$^{2-}$ and BDC$^{2-}$ ratios to investigate solvent self-diffusion