**Scientific Achievement**

New metal–organic frameworks (MOF) with chains of open iron centers were designed to adsorb and release CO with very little energy input. This is mediated by cooperative electronic spin transitions at neighboring iron sites, allowing for the simultaneous binding and release of gas along the chain.

**Significance and Impact**

The use of communicating and responsive metal centers to enable cooperative adsorption can be used as a broader design principle for new MOFs for highly efficient separations of other important gases.

**Research Details**

- Two new MOFs were designed to exhibit step-shaped CO adsorption isotherms with high selectivity for CO over other gases (H₂, N₂, and CO₂).
- Gas sorption, powder X-ray diffraction, and Mössbauer and infrared spectroscopic techniques were used to study the cooperative spin transition mechanism.