Gas Sorption Properties of a Functionalized NbO-type Metal Organic Frameworks

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Metal organic frameworks (MOFs) or porous coordination polymers is an important class of open-framework solids synthesized by the coordination of suitable organic linkers to metal ions or clusters. The hybrid nature of MOFs could give rise to a plethora of advanced nanoporous materials with unique properties.[1] MOFs are considered very important for gas storage and separation applications, including CO_2 selective capture, however framework stability as well as gas uptake and selectivity needs to be improved.[2]

The NbO-type MOFs, made of 4-connected di-isophthalate ligands and 4-connected dicopper paddlewheel units, show excellent framework stability, high porosity, and improved gas adsorption capacity, especially for CO_2 and H_2.[3] We have shown recently that MOFs with functionalized organic ligands can further enhance the gas sorption properties of the resulting material.[4] In this way, by taking advantage the unique NbO platform and using suitable functionalized organic ligands we have successfully synthesized and characterized a series of MOFs with interesting gas sorption properties, including CO_2, CH_4 and H_2. These solids are air stable as shown in Figure 1. Important details will be presented and discussed.

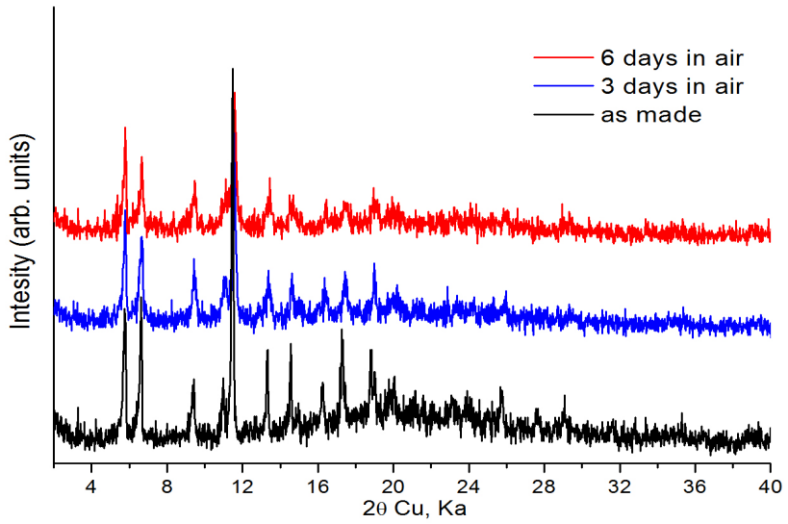

Figure 1. Powder X-Ray diffraction patterns of a copper-based functionalized MOF exposed to air for several days.

References

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