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Exploring the Complex Structural Landscape and Potential Applications of Rare-Earth Metal–Organic Frameworks

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Metal–organic frameworks (MOFs) are structurally diverse, porous materials comprised of metal nodes bridged by organic linkers. [1] Through careful choice of nodes and linkers, the chemical and physical properties of MOFs can be elegantly tuned and materials with very high surface area and porosity can be obtained. As a consequence, MOFs have been explored for many potential applications including, but not limited to, gas storage and release, chemical separations, catalysis, drug delivery, light harvesting and energy conversion, and the detoxification of hazardous analytes. [2] In addition to these promising potential applications, MOFs offer an interesting platform for studying fundamental concepts in inorganic materials chemistry. We are particularly interested in the study of MOFs comprised of rare-earth (RE) elements, [3] in part, because of the high and variable coordination number of these elements, which allows several unique and intricate MOF topologies to be designed and synthesized. Furthermore, RE-MOFs can be produced with diverse optical and electronic properties dictated by the 4f electron configurations of the RE-elements. In this presentation, RE-MOFs are explored from design and synthesis, to potential application.

[1] B. F. Hoskins and R. Robson, 'Infinite polymeric frameworks consisting of three dimensionally linked rod-like segments', J. Am. Chem. Soc. 111, 5962–5964 (1989); O. M. Yaghi and H. Li, 'Hydrothermal Synthesis of a Metal-Organic Framework Containing Large Rectangular Channels', J. Am. Chem. Soc. 117, 10401–10402 (1995)
[2] A. J. Howarth, Y. Liu, P. Li, Z. Li, T. C. Wang, J. T. Hupp and O. K. Farha, 'Chemical, thermal and mechanical stabilities of metal–organic frameworks', Nat. Rev. Mater. 1, 15018 (2016)
[3] F. Saraci, V. Quezada-Novoa, P. R. Donnarumma, 'Rare-earth metal–organic frameworks: from structure to applications', Chem. Soc. Rev., 49, 7949-7977 (2020)

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