(Multi)functional Metal-Organic Frameworks Incorporating 3D-Carborane-Based Ligands: From Fundamentals to Potential Applications.

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The hydrolytic stability of metal-organic frameworks (MOFs) remains a critical challenge for their successful implementation in industrial applications, where exposure to moisture is often unavoidable. Therefore, developing MOFs with robust stability in the presence of water is essential.

Carboranes (**CBs**) are icosahedral carbon-containing boron clusters possessing several material-favorable properties (such as rigidity, thermal and chemical stability and hydrophobicity) and are commercially available on the kilogram scale. Through the continuous investigation on carborane-based MOFs (**CB-MOFs**), **CB**-based ligands with various functional groups have been exploited in our group and several novel MOFs with distinct architectures have been engineered and constructed.[1-3] This has constituted an indispensable groundwork for the development of novel polymeric boron-rich materials with new and improved luminescence[4] or magnetic properties.[5]

In this lecture, I will present an overview of our ongoing research on the design of CB-MOFs, highlighting the integration of lanthanide[6] and transition metal[7] ions to produce complex multifunctional materials with potential for advanced technological applications.

References

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