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Guest@MOF: Emergent Properties for Electronic Device Applications

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Metal-Organic Frameworks (MOFs) are a recently created class of supramolecular materials in which metal ions are coordinated to rigid organic “linker” molecules, creating a nanoporous structure with an exceptional degree of synthetic versatility. These properties make them highly attractive as recognition layers for chemical sensing. However, virtually all known MOFs are insulators as a result of the largely ionic nature of the metal-linker bonds, which severely limits their use in other types of electronic devices. Recently, we and others have demonstrated MOFs that are either intrinsically conducting or become conducting by introducing guest molecules into their pores (Guest@MOF). In this presentation, I will discuss the use of MOFs for chemical sensing, radiation detection, light harvesting, and will demonstrate the potential for creating other types of electronic devices by using conducting MOFs based on the Guest@MOF concept. These results suggest that Guest@MOF represents a novel class of electronic materials with the potential to bridge the properties gap between inorganic and organic conductors, providing a high degree of electronic tailorability combined with long-range order for high charge mobility.

主催：九州大学　最先端有機光エレクトロニクス研究センター
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