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Single-Crystal-to-Single-Crystal Transformations of Metal–Organic-Framework-Supported, Site-Isolated Trigonal-Planar Cu(I) Complexes with Labile Ligands

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Transition-metal complexes bearing labile ligands can be difficult to isolate and study in solution because of unwanted dinucleation or ligand substitution reactions. Metal–organic frameworks (MOFs) provide a unique matrix that allows site isolation and stabilization of well-defined transition-metal complexes that may be of importance as moieties for gas adsorption or catalysis.

Herein we report the development of an in situ anion metathesis strategy that facilitates the post-synthetic modification of Cu(I) complexes appended to a porous, crystalline MOF. By exchange of coordinated chloride for weakly coordinating anions in the presence of carbon monoxide (CO) or ethylene, a series of labile MOF-appended Cu(I) complexes featuring CO or ethylene ligands are prepared and structurally characterized using X-ray crystallography. These complexes have an uncommon trigonal planar geometry because of the absence of coordinating solvents. The porous host framework allows small and moderately sized molecules to access the isolated Cu(I) sites and displace the “place-holder” CO ligand, mirroring the ligand-exchange processes involved in Cu-centered catalysis.

Presenter Gender

Man

Do you wish to take part in the Student Poster Slam

No

Condition of submission

Yes

Students Only - Are you interested in AINSE student funding

Level of Expertise

Early Career <5 Years

Pronouns

He/Him

Which facility did you use for your research

Australian Synchrotron

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