

CARBONYL COMPLEXES AS SYNTHONS FOR LOW-VALENT METAL-ORGANIC FRAMEWORKS

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Incorporating low-valent metals as nodes in metal-organic frameworks (MOFs) is very different to the commonly accepted strategy to create robust and porous structures, which relies on strong electrostatic interactions between anionic ligands and cationic metals [1]. The reactivities of low-valent metals are unique, but the translation of these properties into MOFs is largely impeded by the lack of generalizable synthetic approaches. In this talk we will discuss and demonstrate the use of homoleptic metal carbonyls as suitable zero-valent synthons, which, by partial chemical substitution, we have shown to tether ditopic ligands into MOF architectures [2,3]. Taking advantage of the volatility of the carbonyls and simple linkers we also demonstrate that such frameworks can be synthesized via simple gas phase reactions (Figure 1).

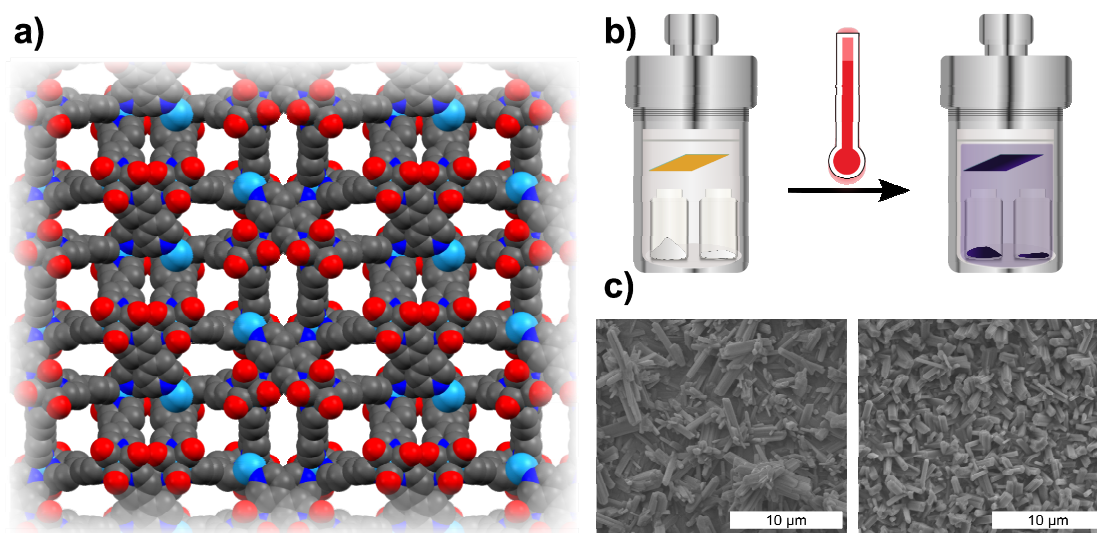


Figure 1: **a)** View of the 3D-ED structure of *fac*-W(CO)₃(4,4'-bipyridine)_{3/2}, **b)** the synthetic setup for the gas phase coating of a suspended substrate and **c)** SEM images of crystalline coatings generated at different reaction conditions. Adapted from [3].

[1] Sikma, R. E., Balto, K. P., Figueroa, J. S., Cohen S. M., *Angew. Chem. Int. Ed.* **2022**, 61, e202206353

[2] Voigt, L., Larsen, R.W., Kubus, M., Pedersen, K. S., *Chem. Commun.*, **2021**, 57, 3861

[3] Andersen C.E., McPherson J.N., Giménez-Marqués M., Kubus M., Ito S, Göb CR, Larsen, R.W., Espallargas, G.M., Pedersen, K. S. *preprint*, **2023**, DOI: [10.26434/chemrxiv-2023-xp3qq](https://doi.org/10.26434/chemrxiv-2023-xp3qq)