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*Defects and Doping in Metal-Organic Frameworks*

Today, most chemical reactions are catalyzed by transition metals. However, the terrestrial abundance of these metals varies dramatically – the 1st row and early 2nd and 3rd rows are relatively abundant. In contrast, platinum groups metals (PGMs, those in the mid-to-late portion of the 2nd and 3rd row) are dramatically scarcer. Indeed, numerous academic and industrial processes rely on chemistry enabled by PGMs, but there is an increasing need to both replace these PGMs, and develop new catalysts based on the earth abundant metals (EAMs).

Metal-organic frameworks (MOFs) are one class of materials that satisfy this motivation, and are comprised of organic anions and EAMs (and EAM clusters). Their compositional diversity results in a family of low-density, extremely high surface area architectures. However, MOFs have been historically treated as defect-free materials. This talk discusses the chemistry enabled by defects in MOFs through examination of their vacancies, binding to protonic adatoms, and substitutions.

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