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Chemistry

Synthetic Manipulation of Porous Materials for Task-Specific Applications

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Porous materials have demonstrated great potential for applications in gas storage, gas separation, and catalysis. Synthetic chemistry affords an effective tool from a molecular level to functionalize targeted porous materials for task-specific applications. In the first part of this talk, I will demonstrate how metal- organic frameworks (MOFs) can be used for carbon capture and describe strategies to utilize MOFs as a class of highly tunable platforms for chemical transformation of CO 2 through custom design of ligands. In the second part, I will showcase how the synthetic strategies of metallopolymerization and reticular mechanochemistry can be implemented to build a new class of porous materials incorporating designable primary coordination sphere of kinetically inert metal sites, which are not accessible by classical solvothermal synthesis used in MOF preparation. These strategies enable translation of ligand-modulated chemoselectivity from molecular catalysts to heterogeneous porous catalysts. Overall, the molecular manipulation discussed will demonstrate how to unlock the power of functionalities from porous materials for advanced task-specific applications.

Jan 31st | Lopez Hall | Room 106 | @ 12pm