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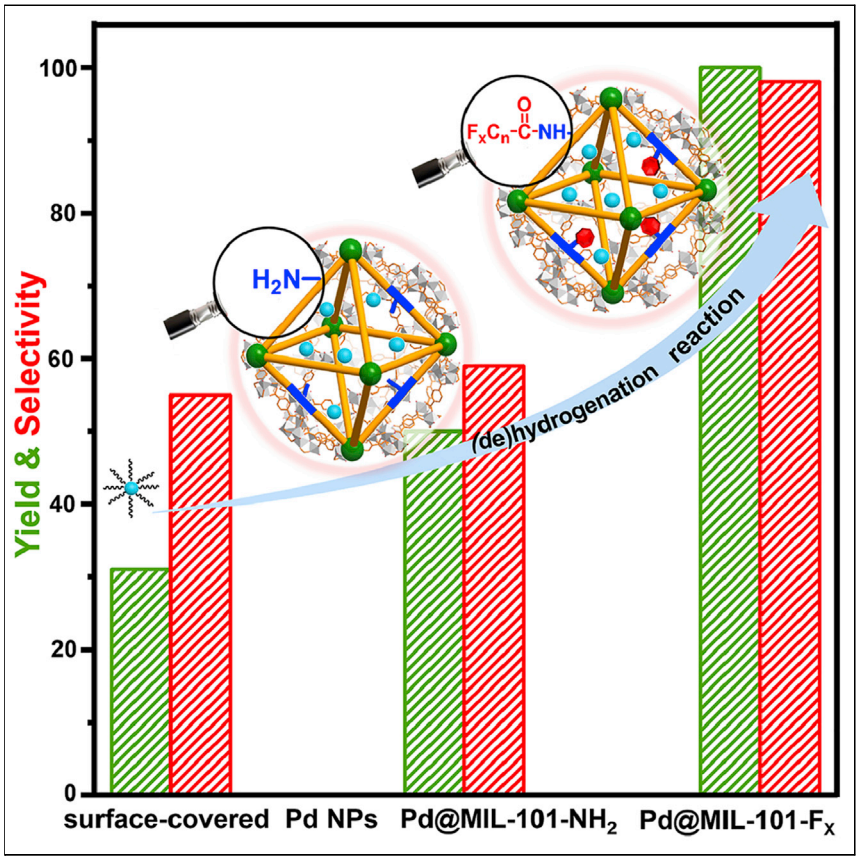
Integration of Pd nanoparticles with engineered pore walls in MOFs for enhanced catalysis



Achieving free-access metal sites with the ability to regulate interactions with substrates is highly desired yet remains a grand challenge in catalysis. Herein, naked Pd nanoparticles were encapsulated inside a metal-organic framework (MOF), giving Pd@MIL-101-NH_2. Its activity and selectivity toward de/hydrogenation reactions can be greatly promoted via the MOF pore wall engineering to regulate Pd surrounding microenvironment and substrate adsorption behavior.

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HIGHLIGHTS

Tunable interaction between metal nanoparticles with substrates is desired

Metal@MOF composites integrate metal nanoparticles with tunable interaction

Tunable microenvironment achieved by metal@MOF via the MOF wettability modification

Enhanced activity/selectivity by modulated microenvironment and substrate enrichment

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