

Selective Semihydrogenation of Alkynes with Copper Nanoparticles Supported on Passivated SilicaN. Kaeffer¹, H. Liu¹, H. Lo¹, A. Fedorov¹, C. Copéret^{1*}¹Department of Chemistry and Applied Biosciences, ETH Zurich

Semihydrogenation of alkynes to Z-alkenes is an important industrial process catalyzed by noble-metal-based systems, in particularly Pd.¹ The scarcity and high price of such catalysts spur the development of alternative earth-abundant semihydrogenation catalysts. For instance, supported Cu nanoparticles were found to catalyze the semihydrogenation of propyne under flow conditions.² Surface organometallic chemistry offers a general approach to small narrowly-dispersed supported metallic nanoparticles using molecular organometallic precursors.³ With this methodology, our group has prepared silica-supported Cu particles and utilized high-throughput screening to identify PCy₃ as a ligand for the highly chemo- and stereoselective semihydrogenation of alkynes into Z-olefins.⁴ Here, we explore the modification of the support through passivation⁵ of the OH group to modify the adsorption properties of the supports and to enable the use of broader ligand libraries.

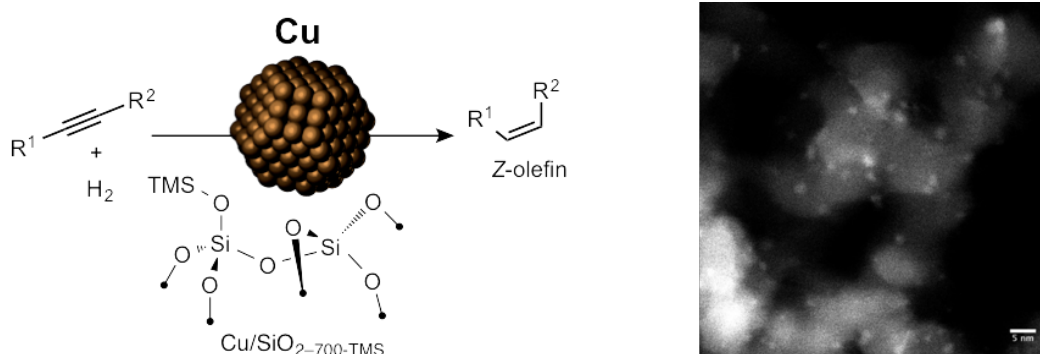


Fig.1. General scheme of selective alkyne semihydrogenation (left) and high-angle annular dark field transmission electron microscopy image of Cu nanoparticles on passivated silica (right).

- [1] G. Vilé et al., *ChemCatChem* **2016**, 8, 21.
- [2] N. J. Ossipoff et al., *J. Catal.* **1994**, 148, 125.
- [3] C. Coperet et al., *Chem. Rev.* **2016**, 116, 323.
- [4] A. Fedorov et al., *J. Am. Chem. Soc.* **2016**, 138, 16502.
- [5] E. Oakton et al., *Dalt. Trans.* **2014**, 43, 15138.