Selective Semihydrogenation of Alkynes with Copper Nanoparticles Supported on Passivated Silica

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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 PCy_3 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 passivation[5] of the OH group to modify the adsorption properties of the supports and to enable the use of broader ligand libraries.

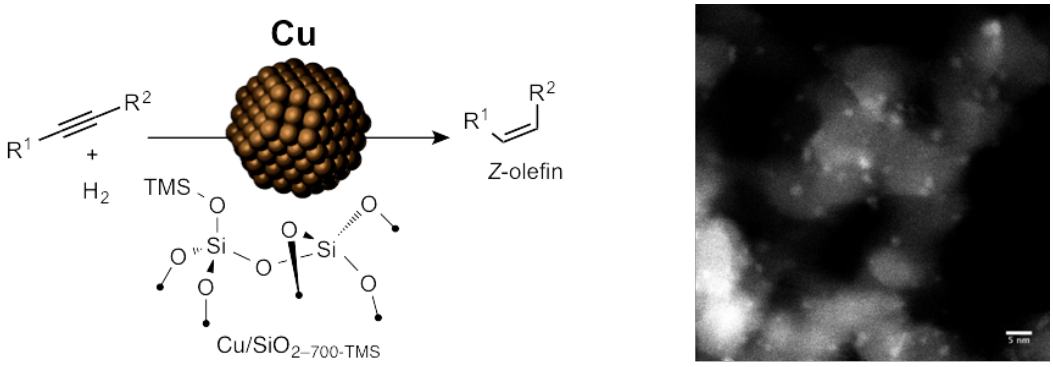

Fig.1. General scheme of selective alkyne semihydrogenation (left) and high-angle annular dark field transmission electron microscopy image of Cu nanoparticles on passivated silica (right).

[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.