Gold Nanoparticles-Catalyzed Activation of 1,2-Disilanes: Hydrolysis, Silyl Protection of Alcohols and Reduction of tert-Benzyllic Alcohols


Significance: Gold nanoparticles supported on titanium dioxide (Au/TiO₂) catalyzed the silylation of water and primary, secondary, and tertiary aliphatic alcohols with 1,2-disilanes via Si–Si bond cleavage to give the corresponding silyl ethers in up to >99% yield (eq. 1). When tertiary benzylic alcohols were used for the reaction, the reduction proceeded to afford the corresponding alkanes as the major products (eq. 2).

Comment: The authors previously reported the oxidative cycloaddition of 1,1,3,3-tetramethyldisiloxane to alkynes catalyzed by Au/TiO₂ (J. Am. Chem. Soc. 2011, 133, 10426). The catalytic activity of Au/TiO₂ for the silylation of water was superior to that of gold nanoparticles supported on other supports such as aluminum oxide (Al₂O₃) and zinc oxide (ZnO).