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


**Silylation of Alcohol Derivatives with 1,2-Disilanes Catalyzed by Au/TiO₂**

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 benzyllic 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-tetramethylsiloxane 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).

**Typical results:**

1. For water and primary alcohols:
   - 1.5 h, 25 °C, 99% yield
   - 0.5 h, 25 °C, 98% yield
   - 1 h, 98 °C, 98% yield

2. For secondary alcohols:
   - 1.5 h, 25 °C, 97% yield
   - 1 h, 25 °C, 92% yield
   - 1.5 h, 25 °C, 93% yield

3. For tertiary alcohols:
   - 1 h, 25 °C, 96% yield
   - 1.5 h, 25 °C, 93% yield
   - 3 h, 25 °C, 96% yield
   - 4 h, 25 °C, 98% yield

4. For benzyllic alcohols:
   - 1.5 h, 82% yield (75:25)
   - 24 h, 95% yield (100:0)

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