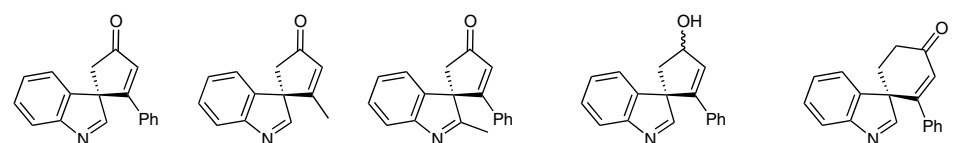
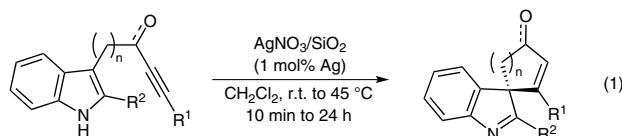


A. K. CLARKE, M. J. JAMES, P. O'BRIEN, R. J. K. TAYLOR,\* W. P. UNSWORTH\*  
(UNIVERSITY OF YORK, UK)

Silica-Supported Silver Nitrate as a Highly Active Dearomatizing Spirocyclization Catalyst: Synergistic Alkyne Activation by Silver Nanoparticles and Silica  
*Angew. Chem. Int. Ed.* **2016**, *55*, 13798–13802.

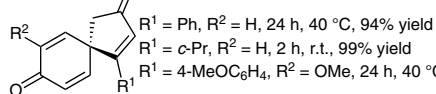
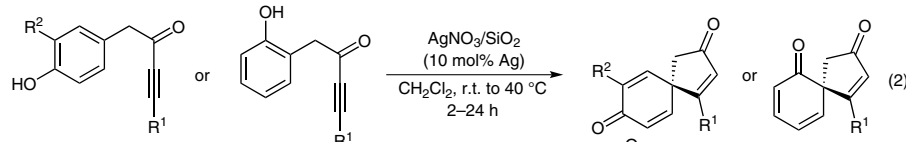
# Spirocyclization of Alkyne-Tethered Aromatics with Silver Nitrate/Silica

Indoles:



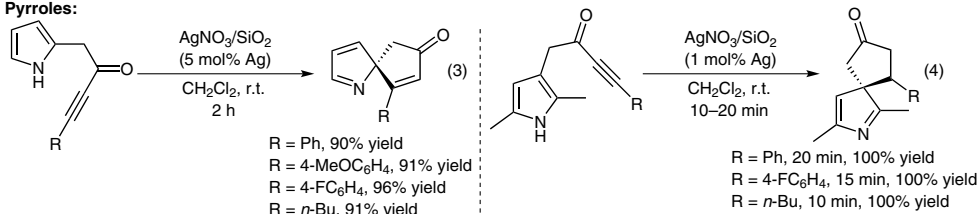
30 min, r.t., 98% yield    10 min, r.t., 94% yield    35 min, r.t., 95% yield    24 h, r.t., 100% yield (dr = 1:0.6)    24 h, 45 °C, 100% yield

Phenols:

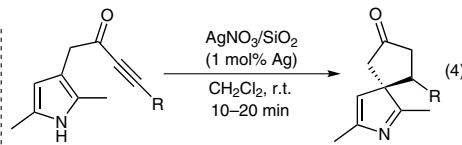


7 h, r.t., 99% yield    2 h, r.t., 90% yield    2 h, r.t., 96% yield

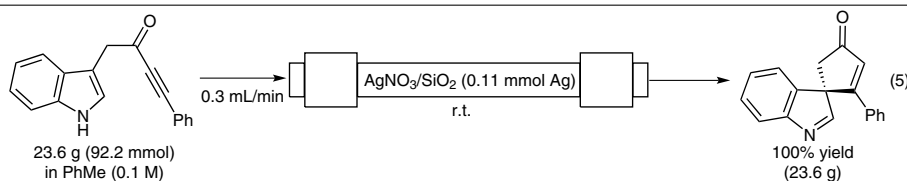
Pyrroles:



R = Ph, 90% yield  
R = 4-MeOC<sub>6</sub>H<sub>4</sub>, 91% yield  
R = 4-FC<sub>6</sub>H<sub>4</sub>, 96% yield  
R = *n*-Bu, 91% yield



R = Ph, 20 min, 100% yield  
R = 4-FC<sub>6</sub>H<sub>4</sub>, 15 min, 100% yield  
R = *n*-Bu, 10 min, 100% yield



**Significance:** Silica-supported silver nitrate ( $\text{AgNO}_3/\text{SiO}_2$ ) catalyzed the dearomatizing spirocyclization of alkyne-tethered aromatics to give the corresponding spirocycles in 86–100% yield (eqs. 1–4).

**Comment:** The continuous-flow reaction of 1-(1*H*-indol-3-yl)-4-phenylbut-3-yn-2-one on a column of  $\text{AgNO}_3/\text{SiO}_2$  gave 5-phenyl-3*H*-spiro[cyclopent-4-ene-1,3'-indol]-3-one in quantitative yield (eq. 5).

**SYNFACTS Contributors:** Yasuhiro Uozumi, Go Hamasaka  
Synfacts 2017, 13(01), 0099    Published online: 19.12.2016  
DOI: 10.1055/s-0036-1589770; Reg-No.: Y16216SF