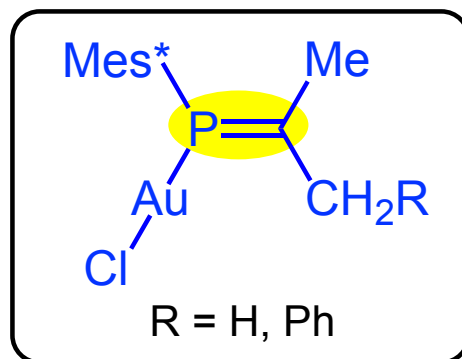
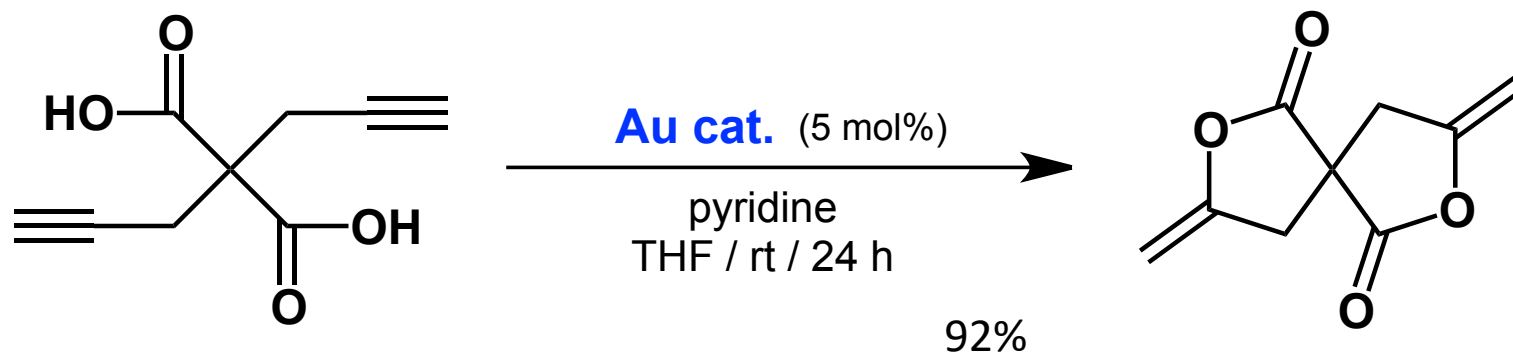
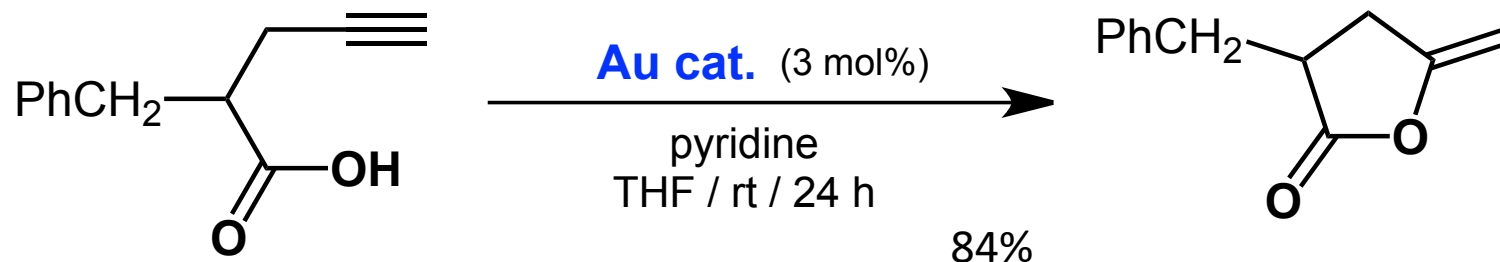


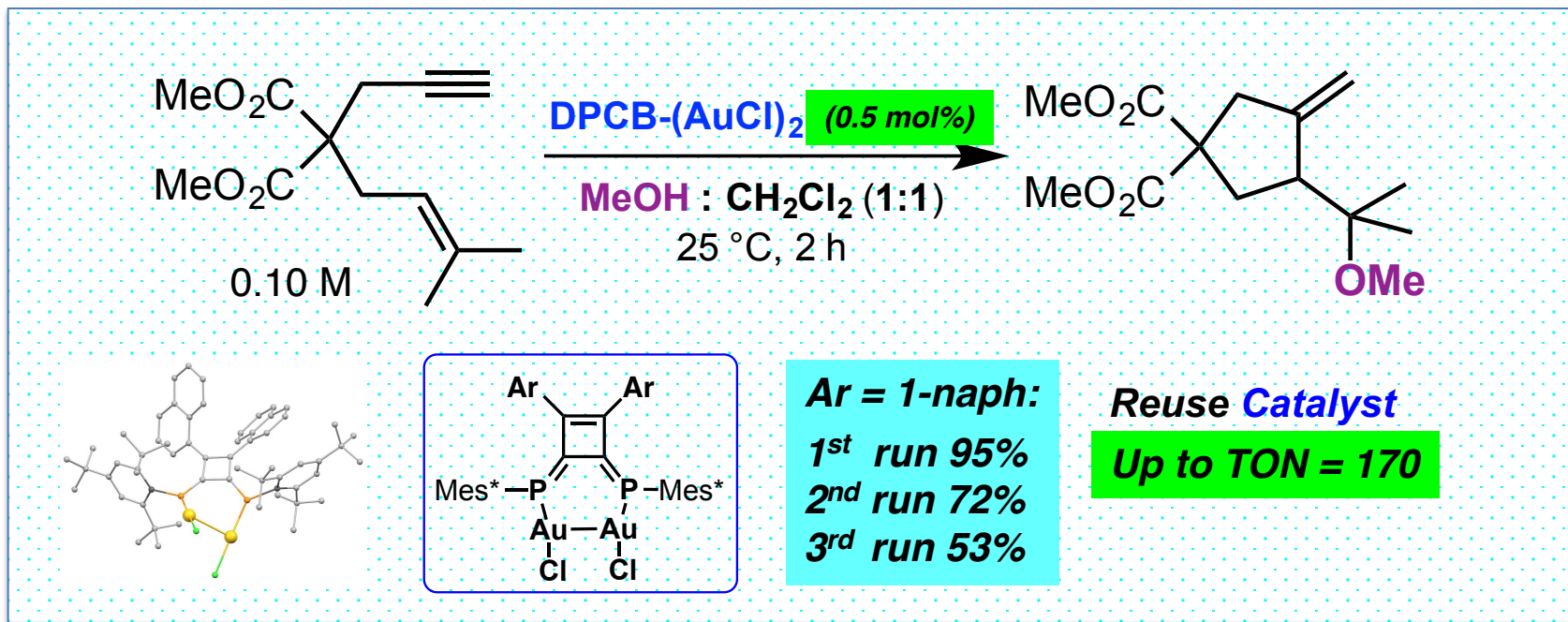
LAuCl Catalysis Using LC Phosphines

Gold-catalyzed reactions under homogeneous conditions are normally performed by using combination of LAuCl (L = phosphine, NHC *etc.*) and AgX co-catalyst. However, this procedure can include considerable “silver effect” (Shi, *JACS* 2012), and the silver-free conditions are suitable to carry out molecular transformations catalyzed by the GOLD centres. Several phosphalkenes of the strong π -accepting property are effective to induce catalytic activity of the chlorogold moiety even if the Au centre is ligated. We are attempting to develop activation-free homogeneous gold catalysis as well as to elucidate the detailed mechanisms of catalytic reactions in the presence of Au reagents. In addition, the “low-coordinated” (LC) phosphines have been employed for developing novel efficient catalytic processes.

Phosphaalkene-Gold(I) Catalysts w/o Activation

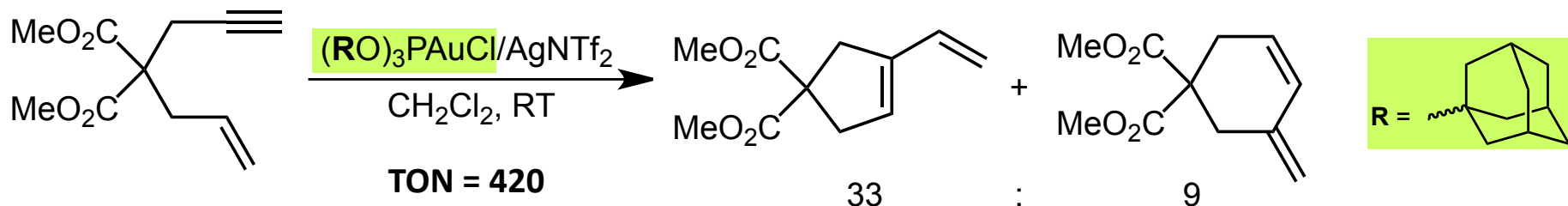


Low-Coordinated Phosphines for **LAuCl** Catalysis



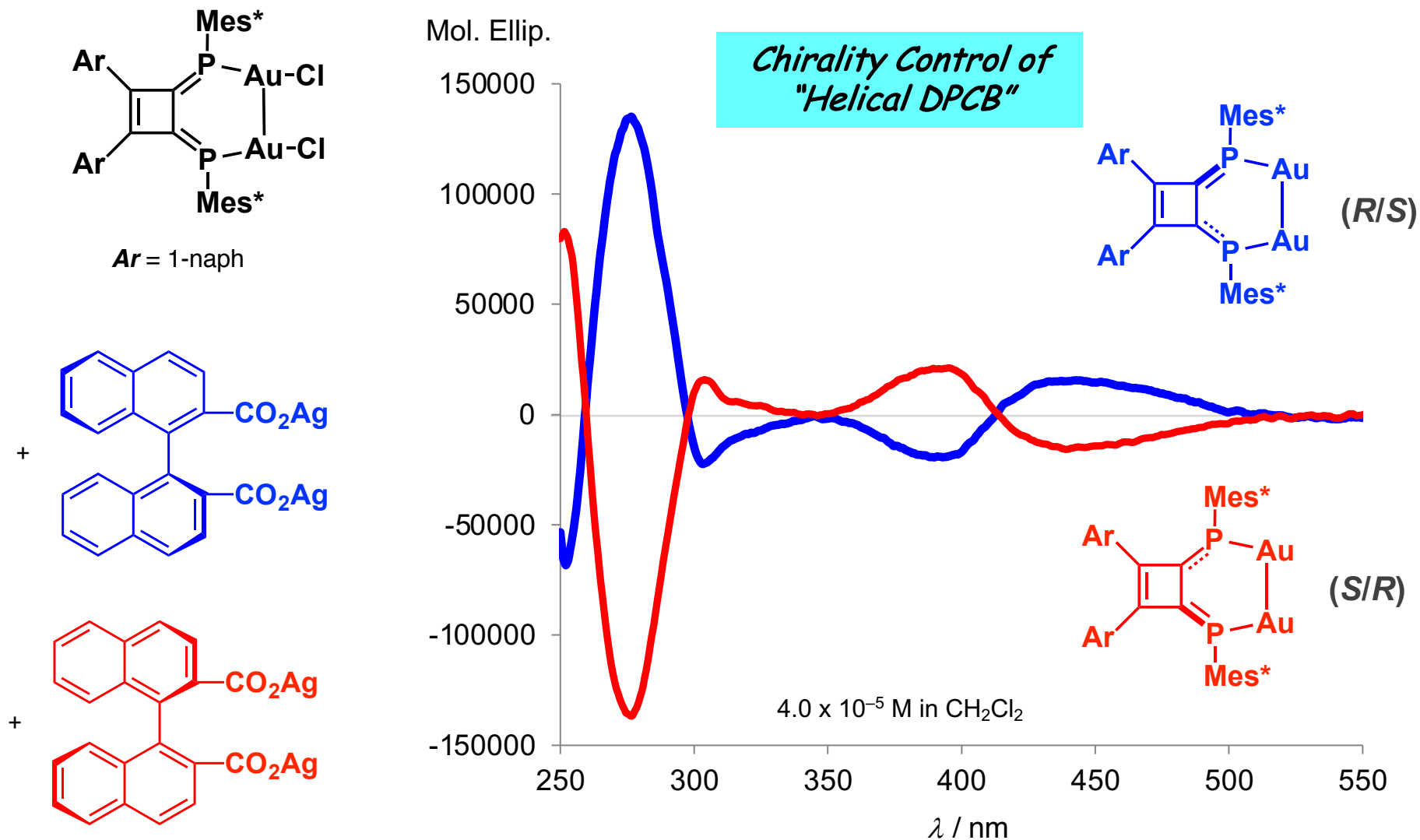
ChemCatChem **2014**, 6, 2292.

cf.

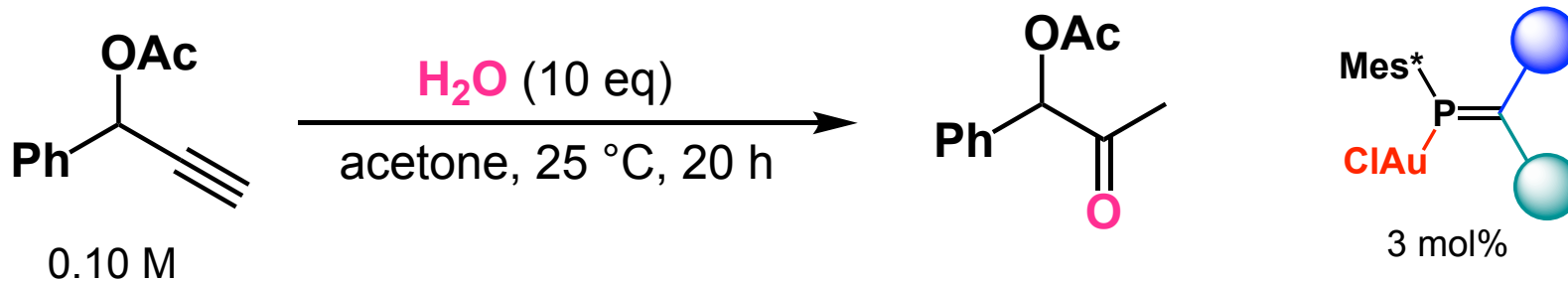
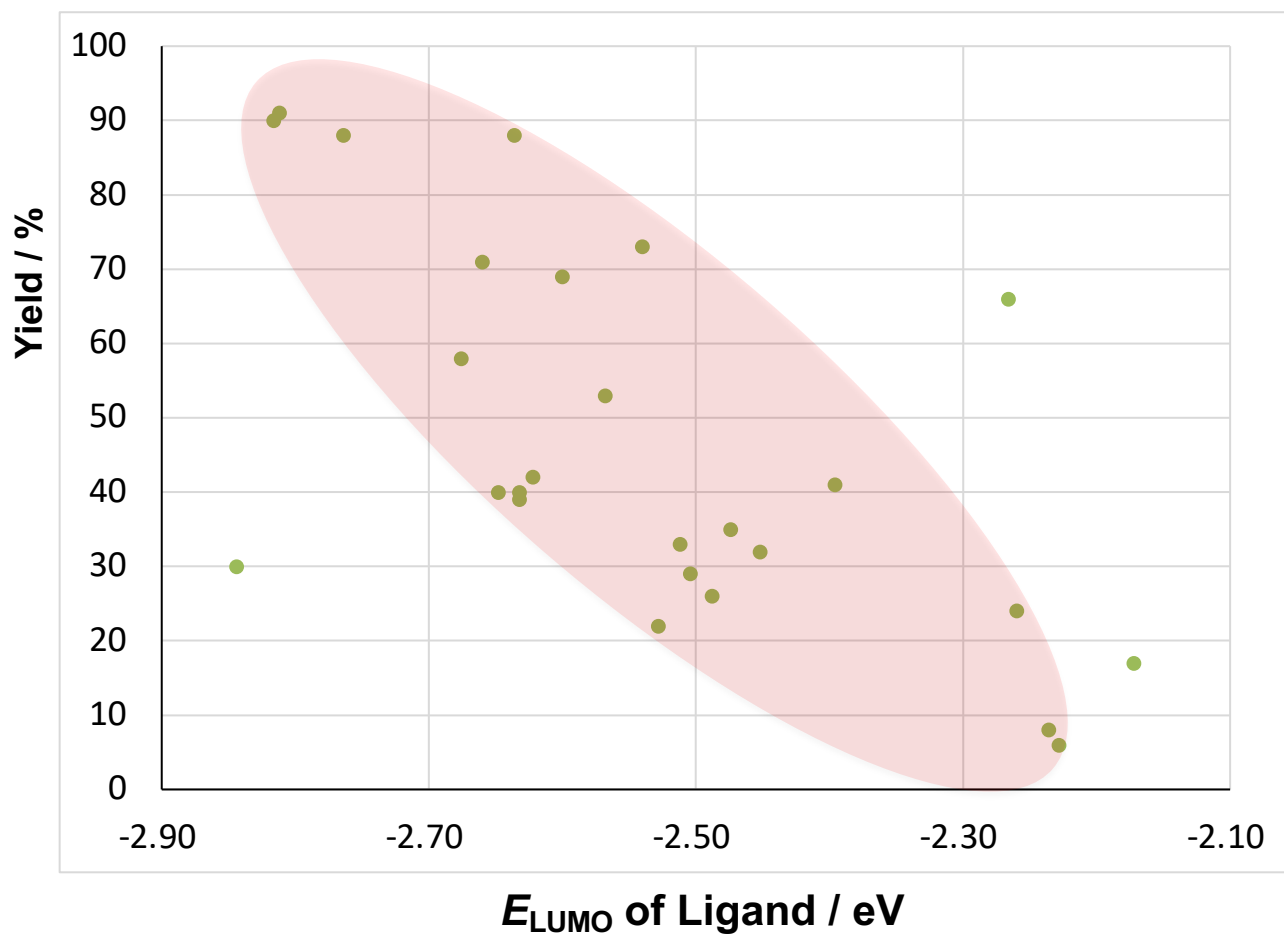


A. S. K. Hashmi *et al.*, *Chem. Commun.* **2014**, 50, 4937.

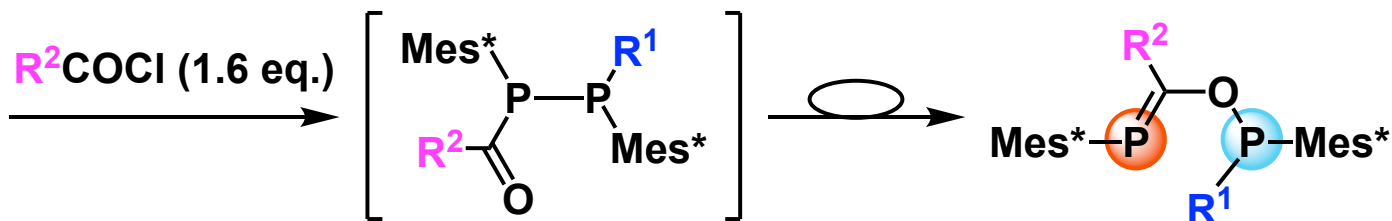
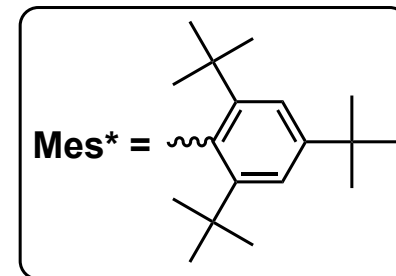
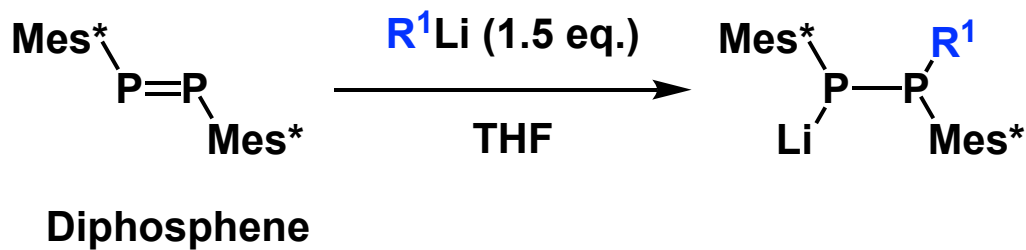
Dynamic DPCB Chirality Control



Ligand Screening: Structure/Activity Relationship

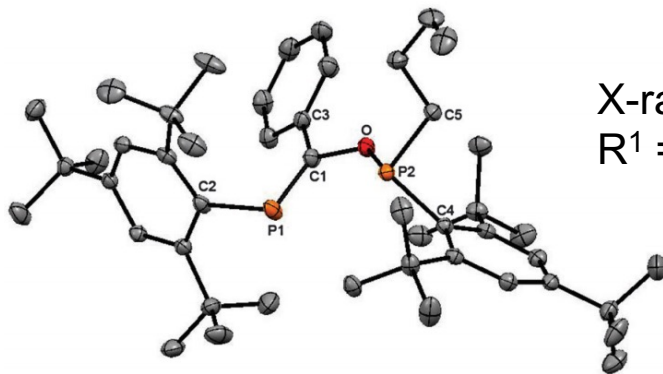


Synthesis of Phosphaalkenes from P=P



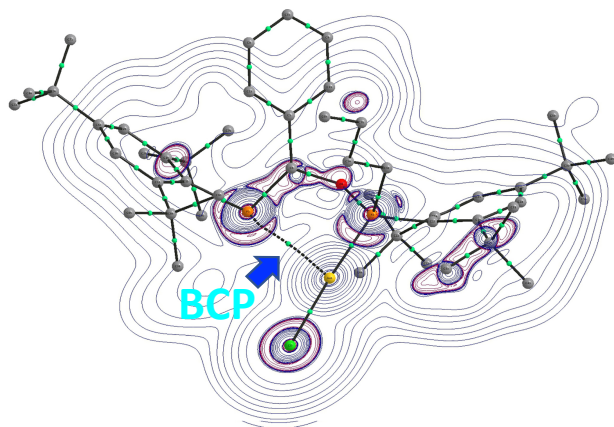
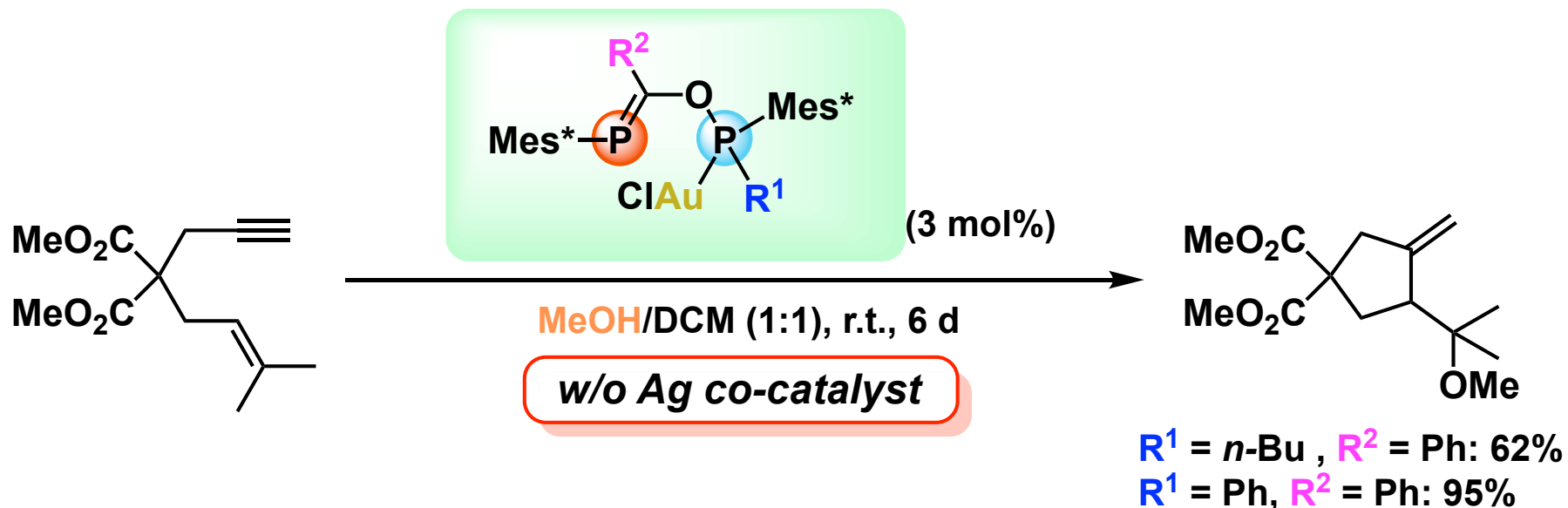
$\text{R}^1 = n\text{-Bu}$, $\text{R}^2 = \text{Ph}$: 60% (isol.)

$\text{R}^1 = \text{Ph}$, $\text{R}^2 = \text{Ph}$: 40% (isol.)

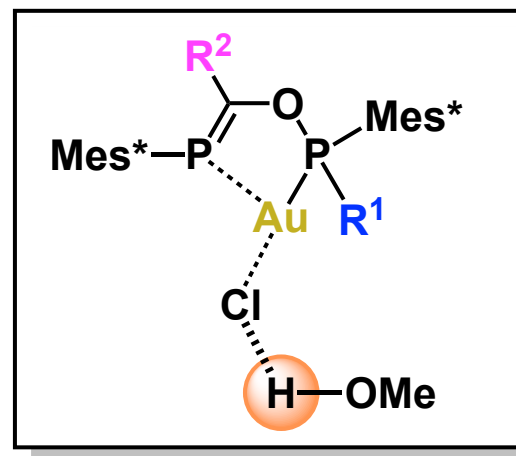


X-ray structure:
 $\text{R}^1 = n\text{-Bu}$, $\text{R}^2 = \text{Ph}$

Mononuclear AuCl Complex for Catalysis



AIM Calculation Data



Indirect effects for promoting catalytic activity of the chlorogold unit