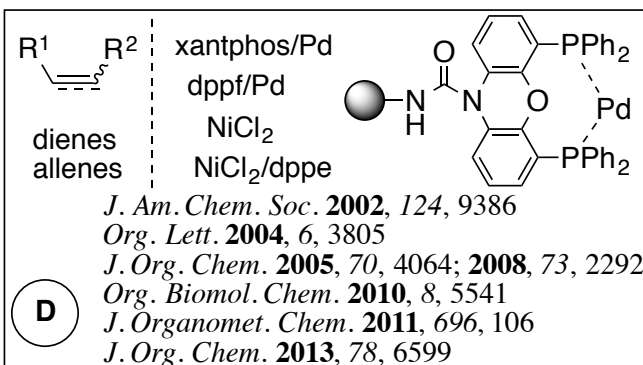
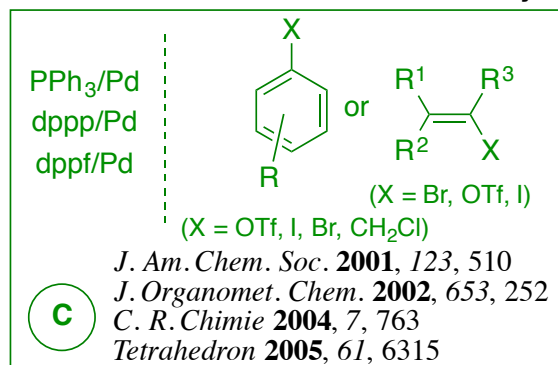
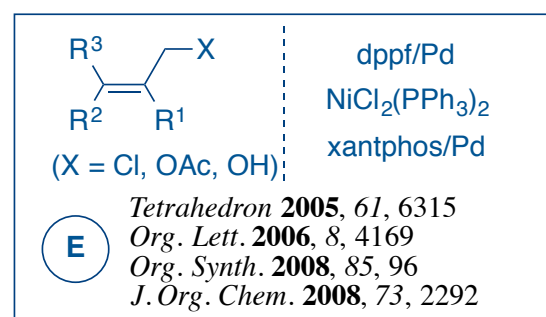


Metal-Catalyzed P-C bond formation

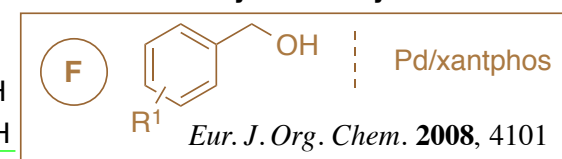


Metal-Catalyzed Allylation

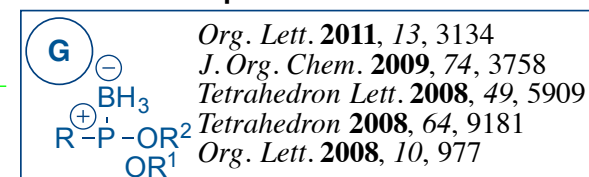


allylation

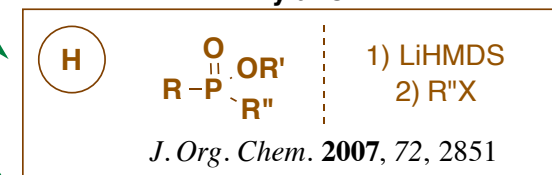
Pd-catalyzed Benzylation



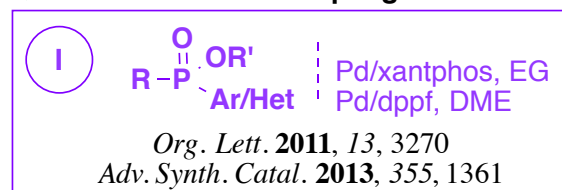
Phosphonite-Borane



Alkylation

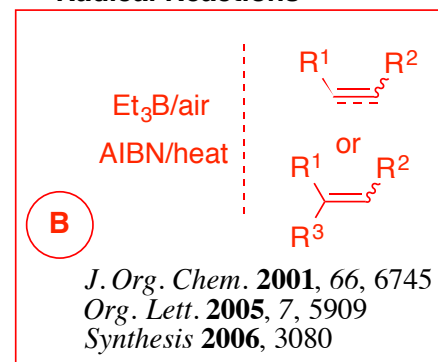


Cross-coupling

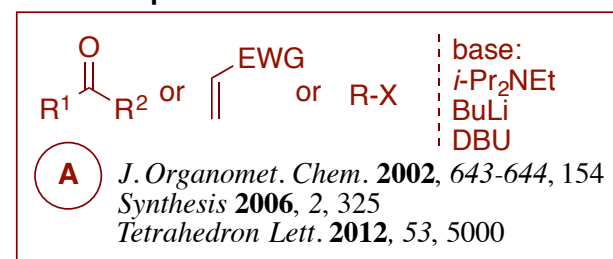


Reviews: *J. Organomet. Chem.* **2005**, 690, 2388
Eur. J. Org. Chem. **2008**, 3601
Phosphorus, Sulfur, Silicon. **2013**, 188, 66
Acc. Chem. Res. **2014**, 47, 77

Radical Reactions



Nucleophilic Reactions



Oxidation/Catalytic P-O Bond Formation

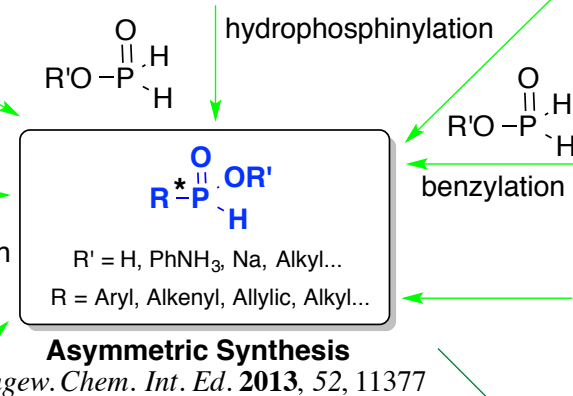


cross-coupling

radical

hydrophosphinylation

addition/
substitution



hydrophosphinylation

benzylation

"P-H activation" Pd- and Mn-catalyzed 2nd P-C bond or Mn-promoted 2nd P-C bond

