

Organometallics Chemistry (CHEM-7149)

Online Lectures (OrganoPd)

Prof Dr Abdul Rauf Raza

Professor (Tenured)

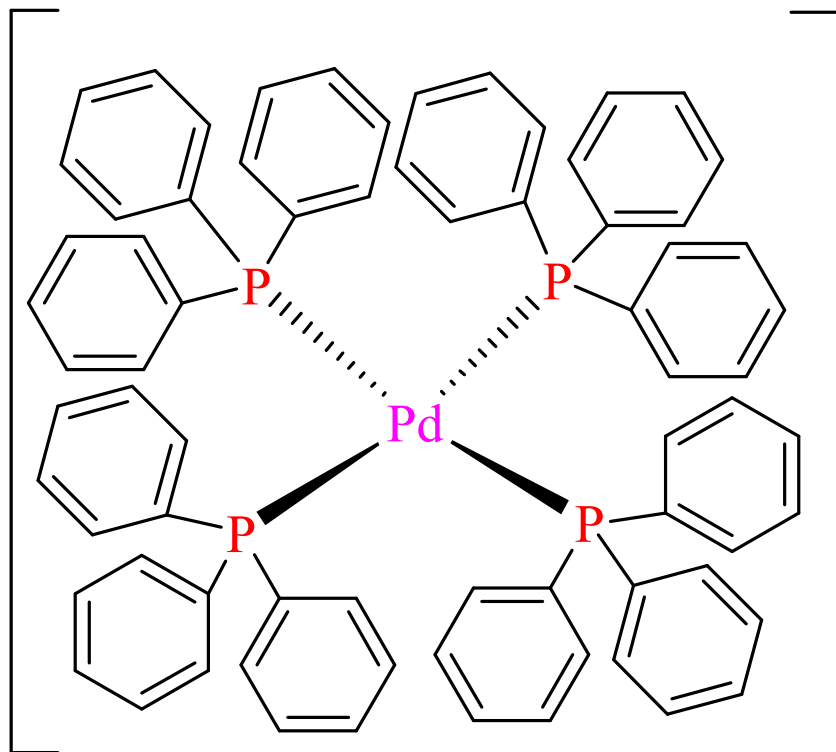
Institute of Chemistry

University of Sargodha, Sargodha

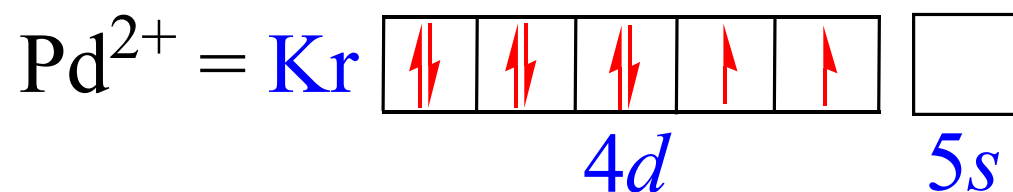
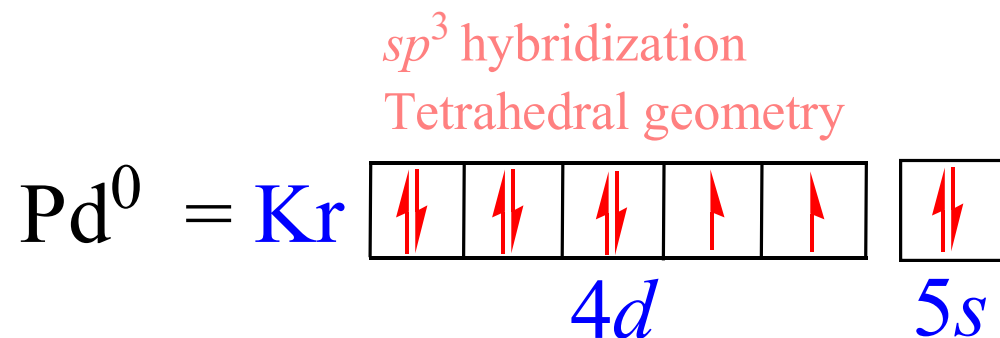
Periodic Table

<i>s</i> -Block metals												<i>p</i> -Block Elements	
Group-I	Group-II											XIII	XIV
H												B	C
Li	Be	<i>d</i> -Block metals										Al	Si
Na	Mg	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Ga	Ge
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	In	Sn
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	Tl	Pb
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg		
Fr	Ra												

OrganoPd

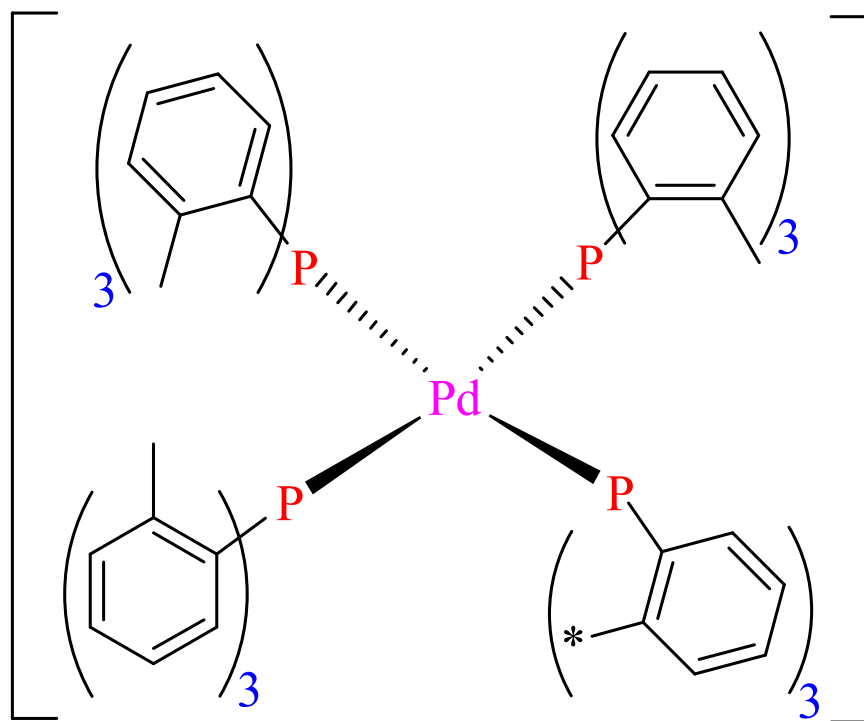
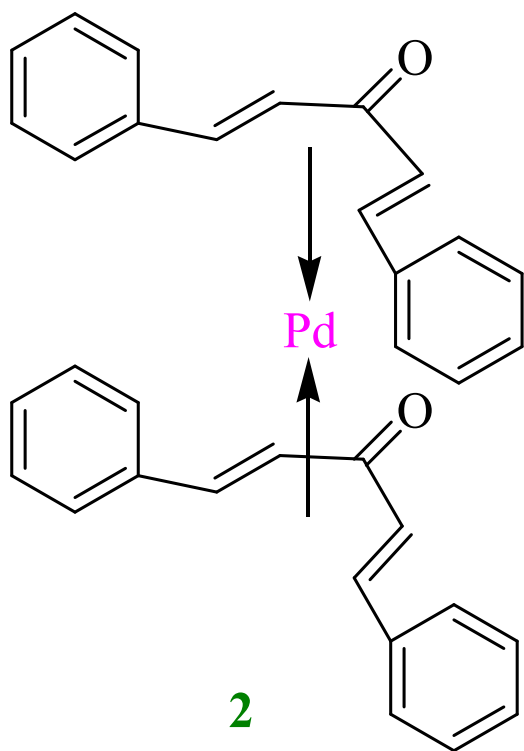
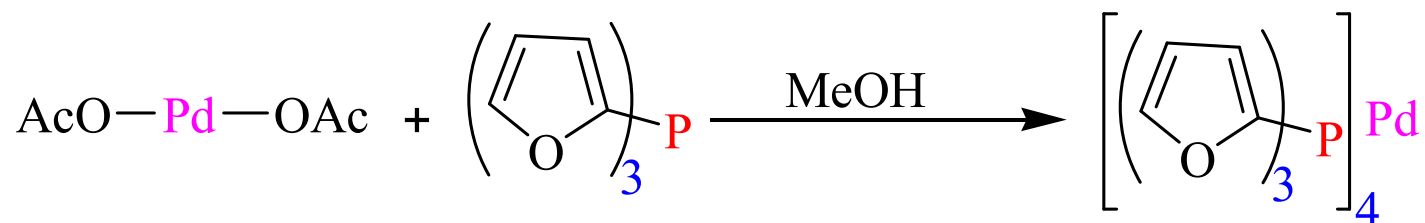
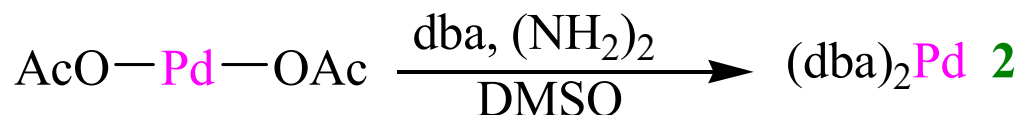
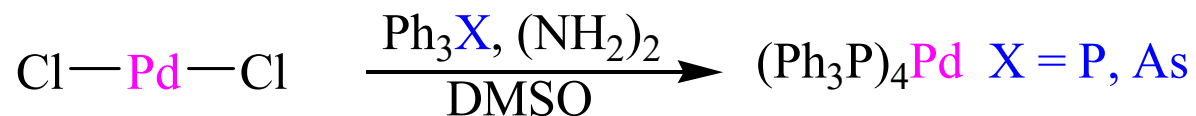


Tetrakis(triphenylphosphine)palladium[0]
Tetrakis(triphenylphosphine)palladium[II]

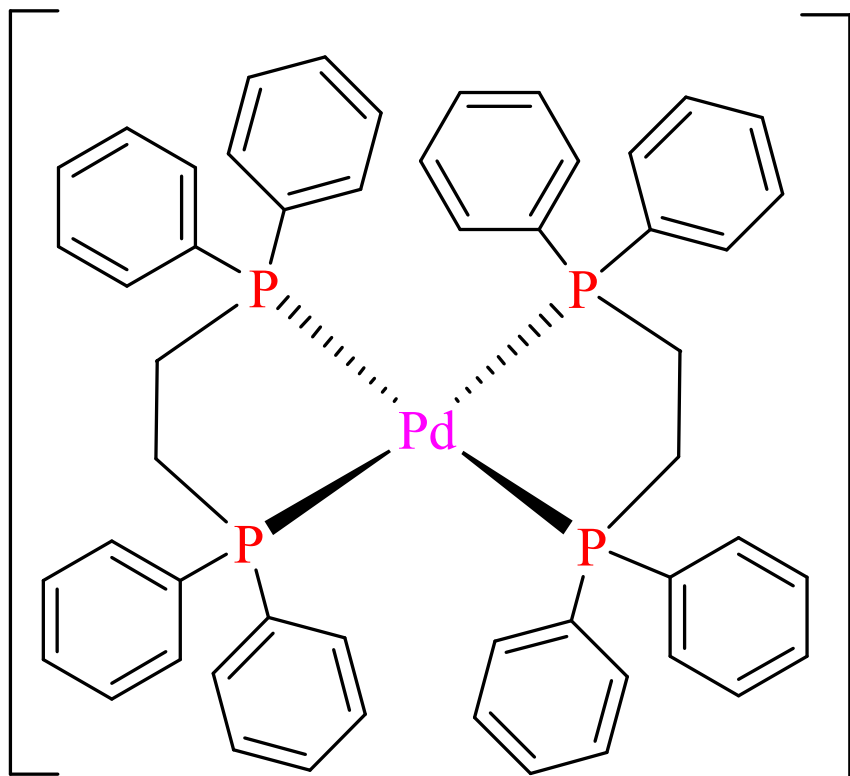


dsp² hybridization
Square planar /
trigonal pyramidal geometries

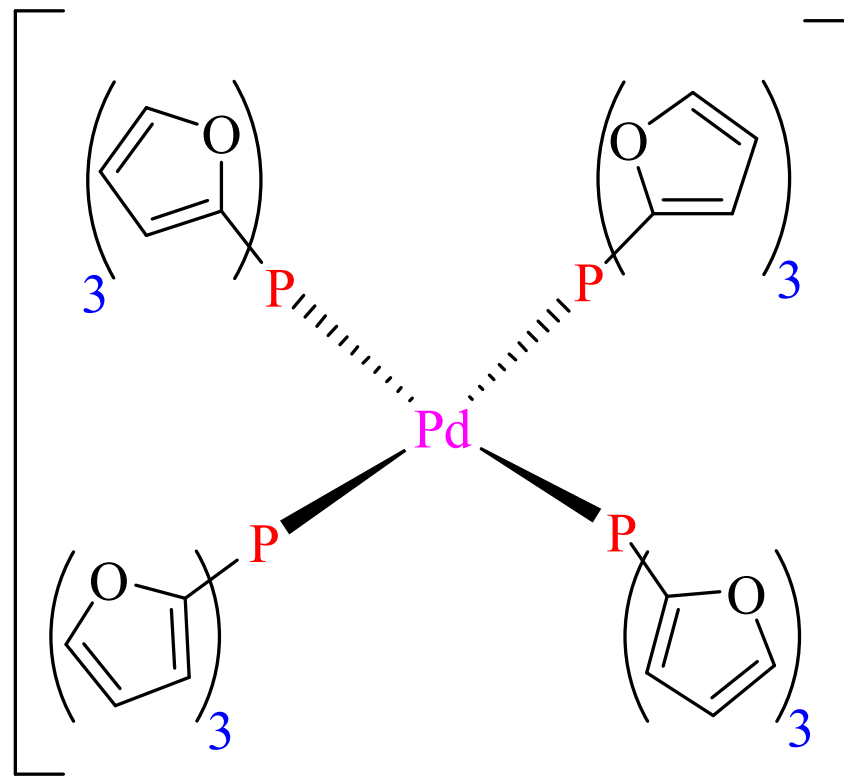
Preparation of Catalysts



Preparation of Catalysts

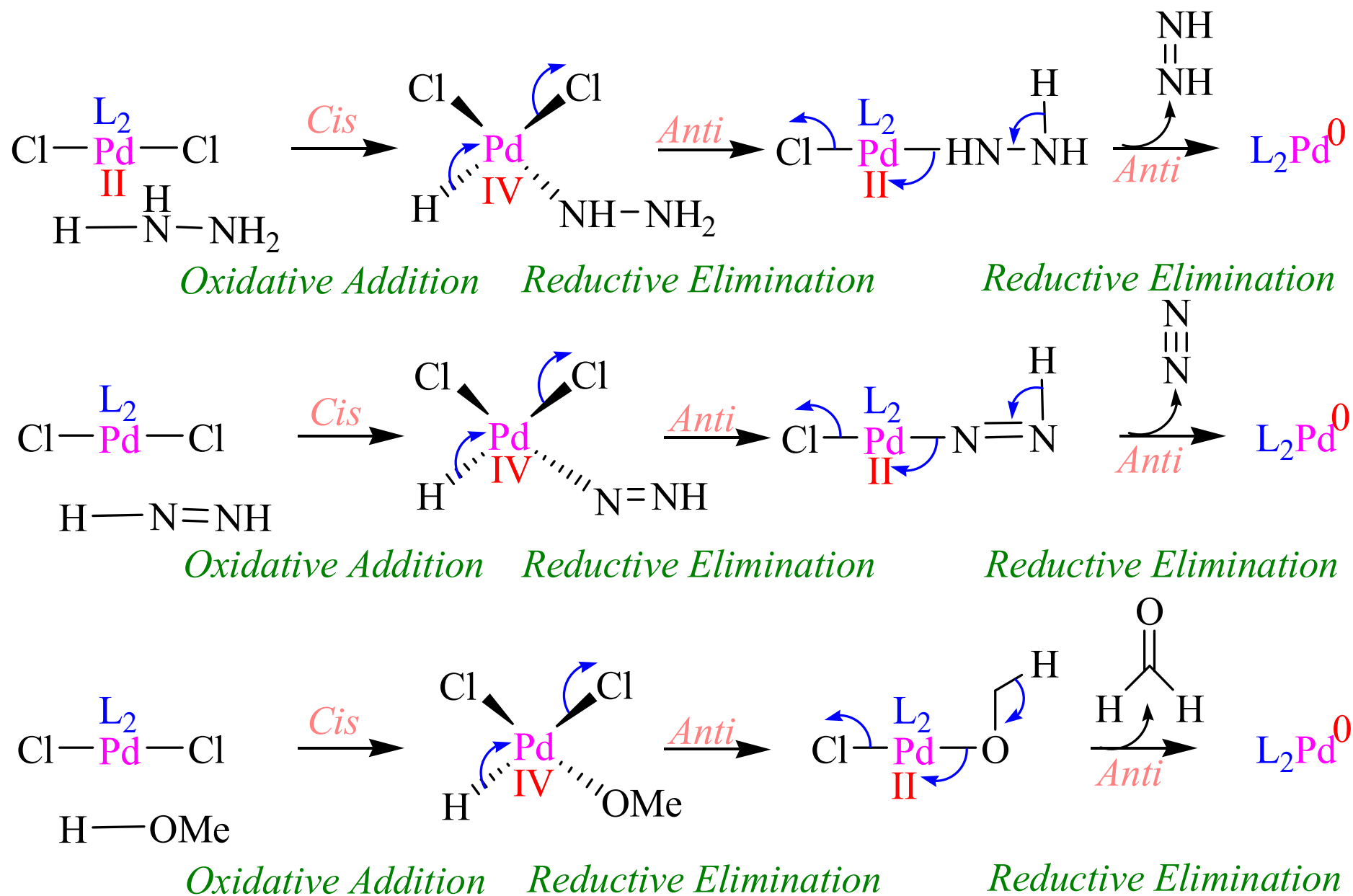


Bis[1,2-bis(diphenyl)ethyl]palladium[0]

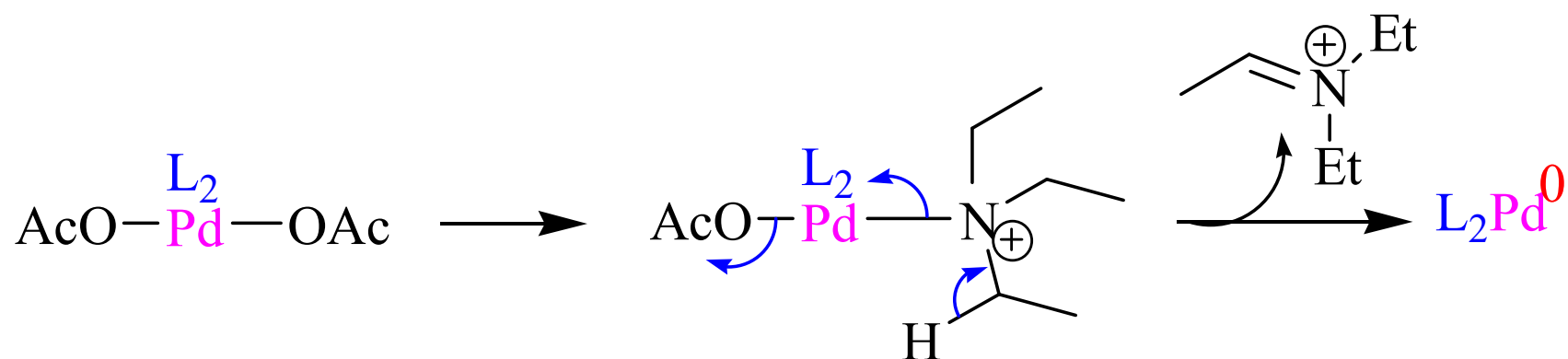
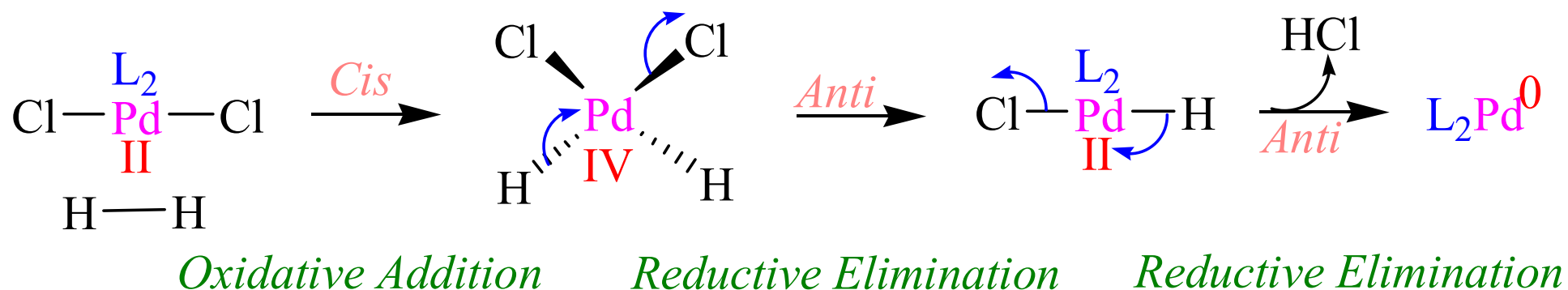


Tetrakis[tri(o-furylphosphine)]palladium[0]

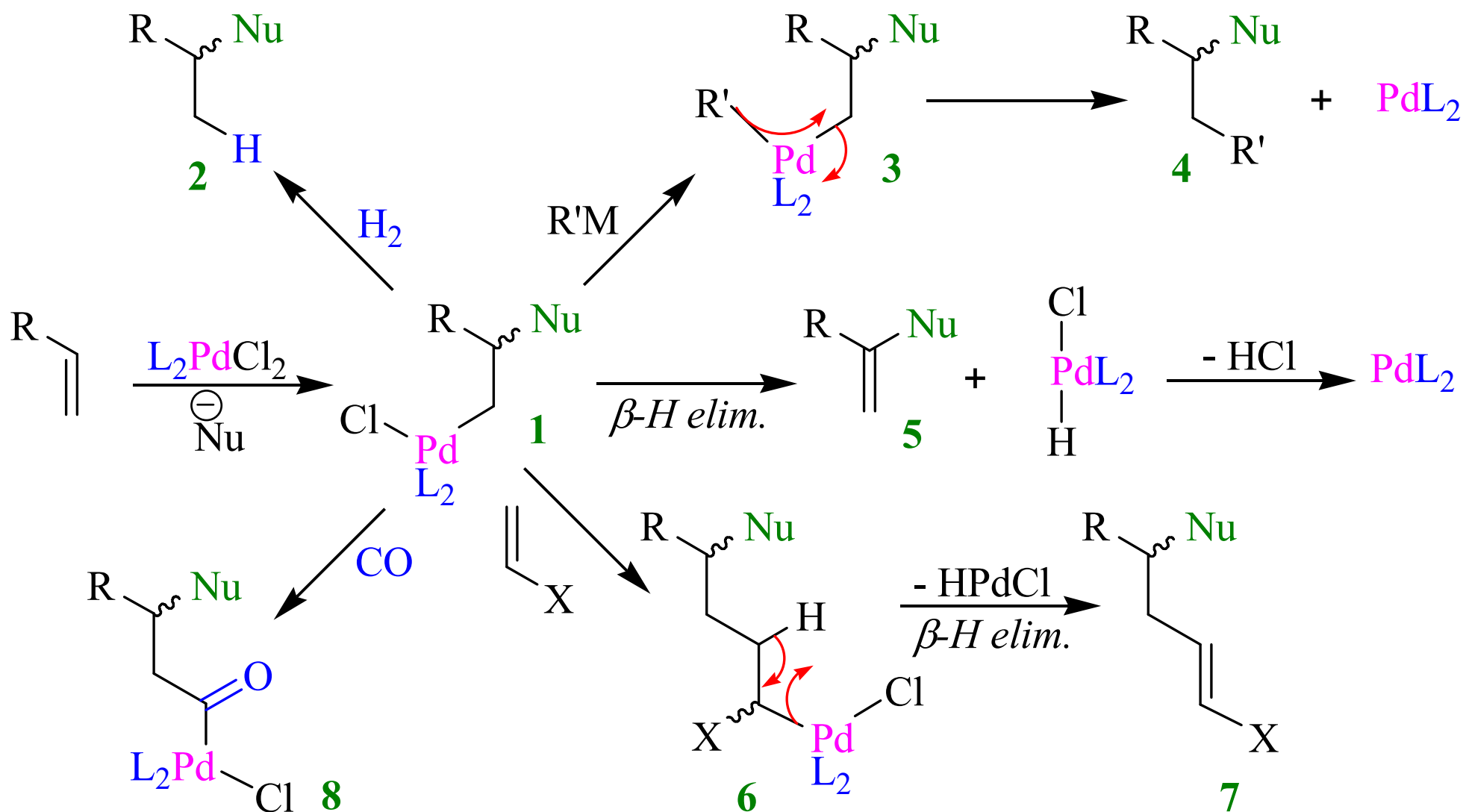
Reduction of Pd[II] to Pd[0]



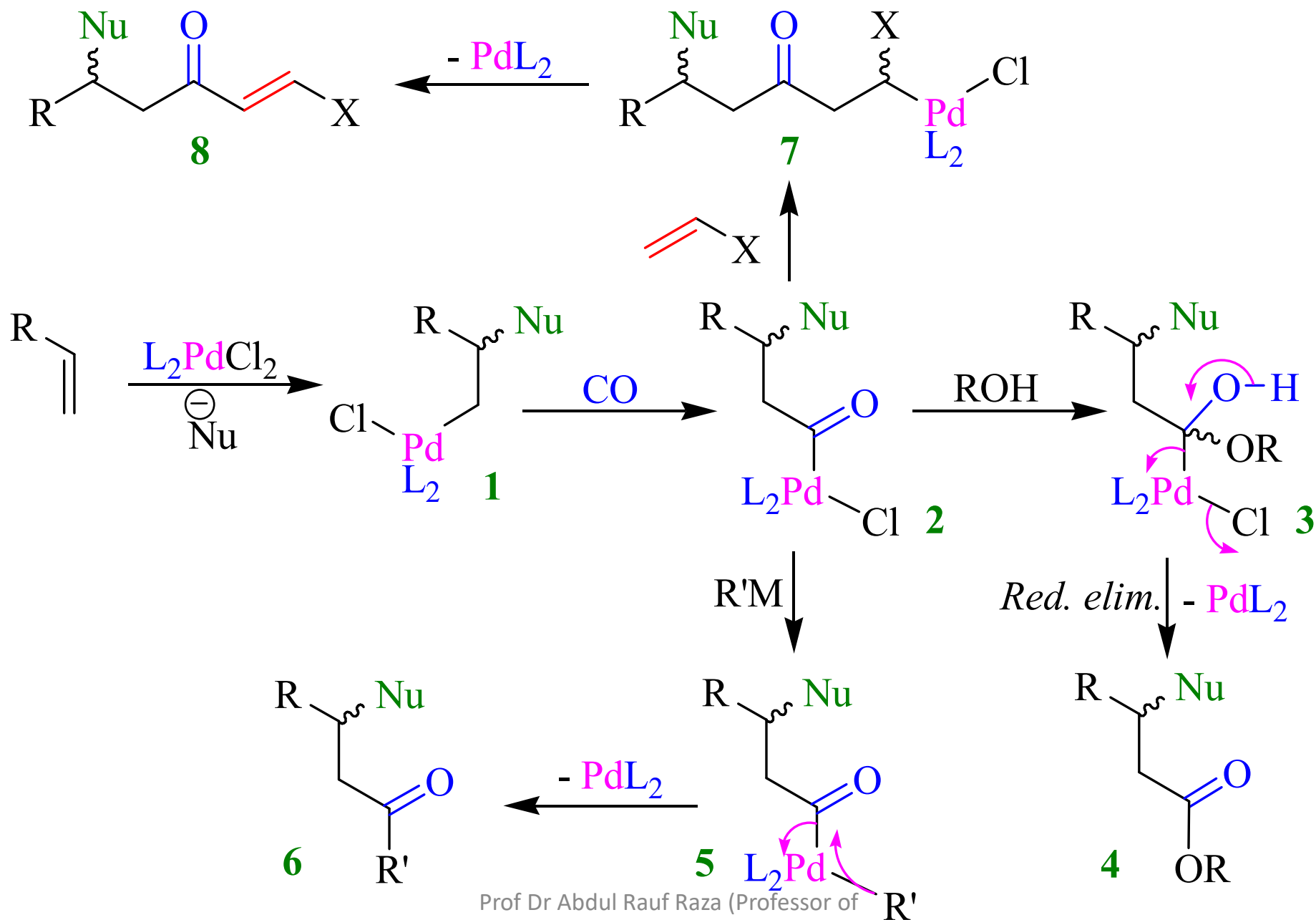
Reduction of Pd[II] to Pd[0]



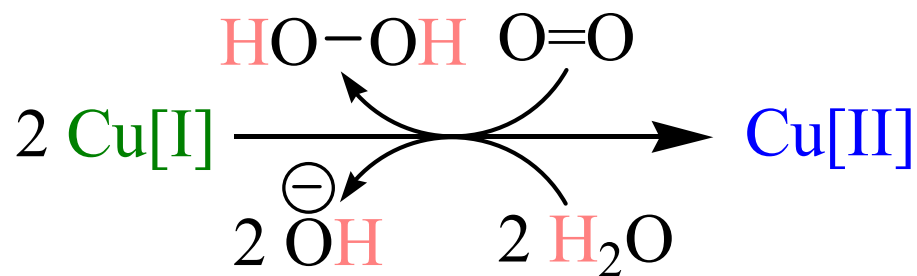
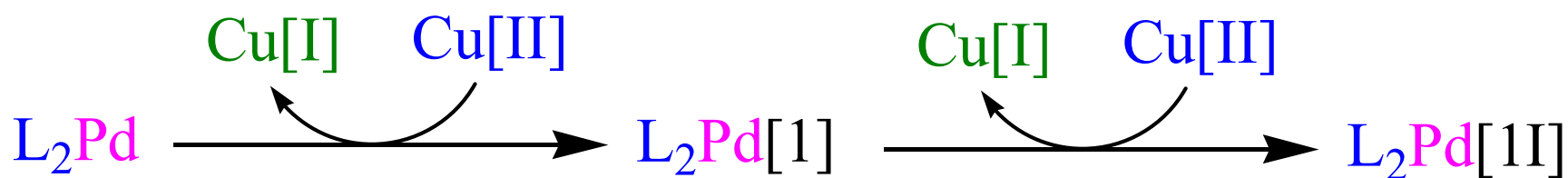
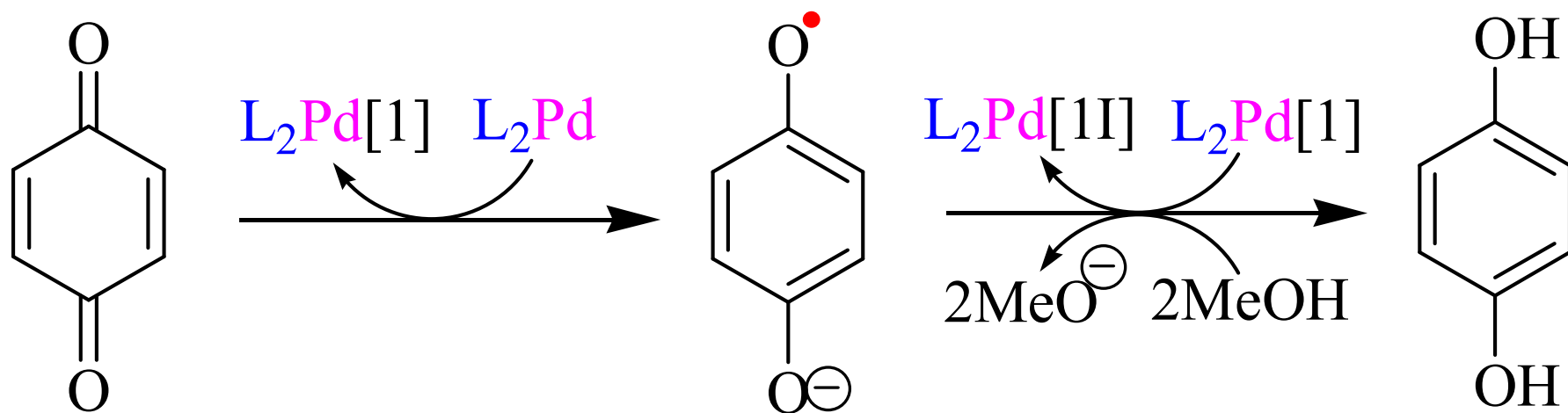
Pd[II] Chemistry



Pd[II] Chemistry

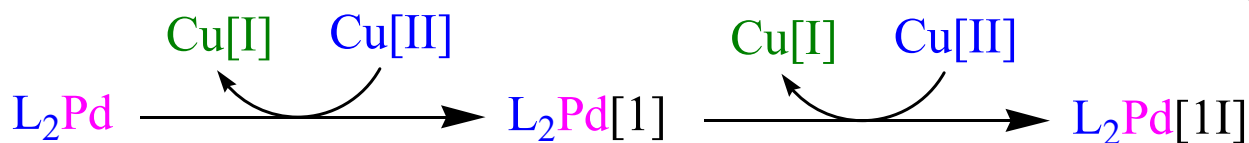
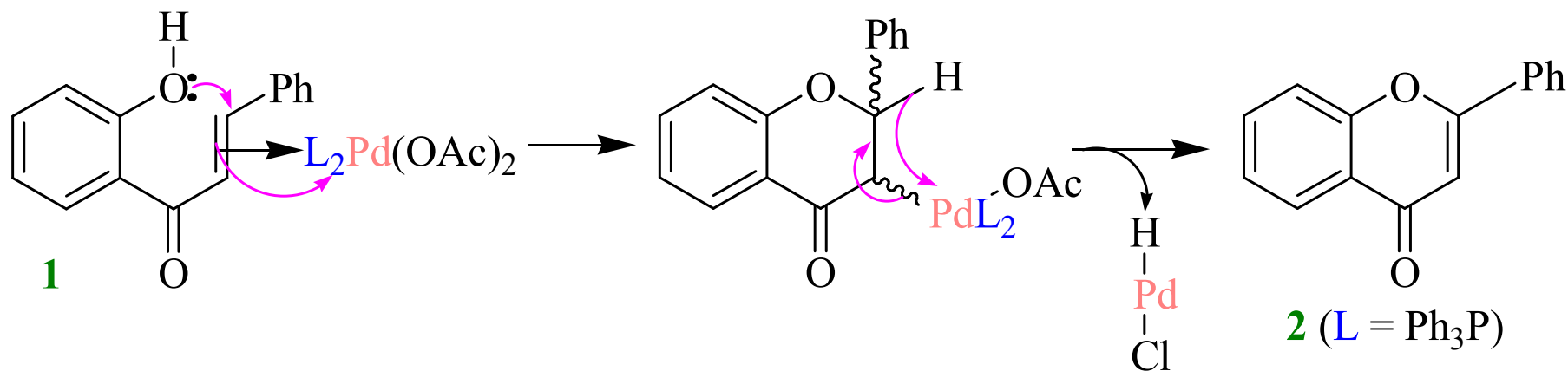
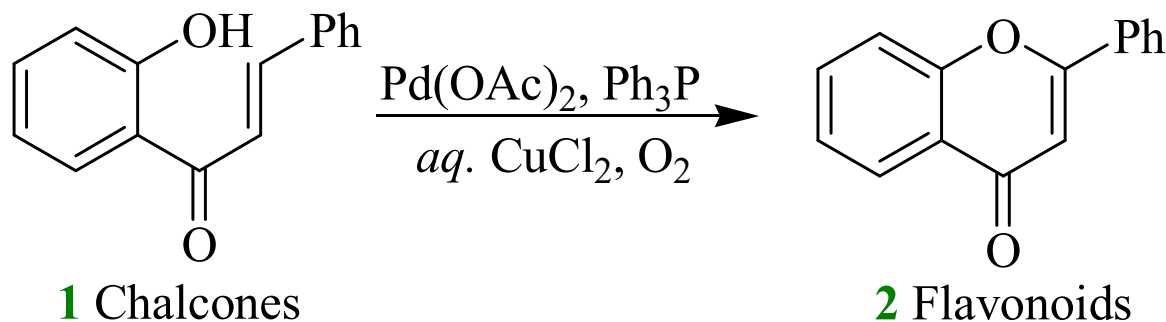


Reoxidation of Pd[0] to Pd[II]

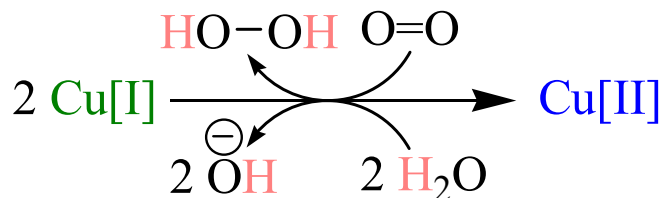


Wacker's Process

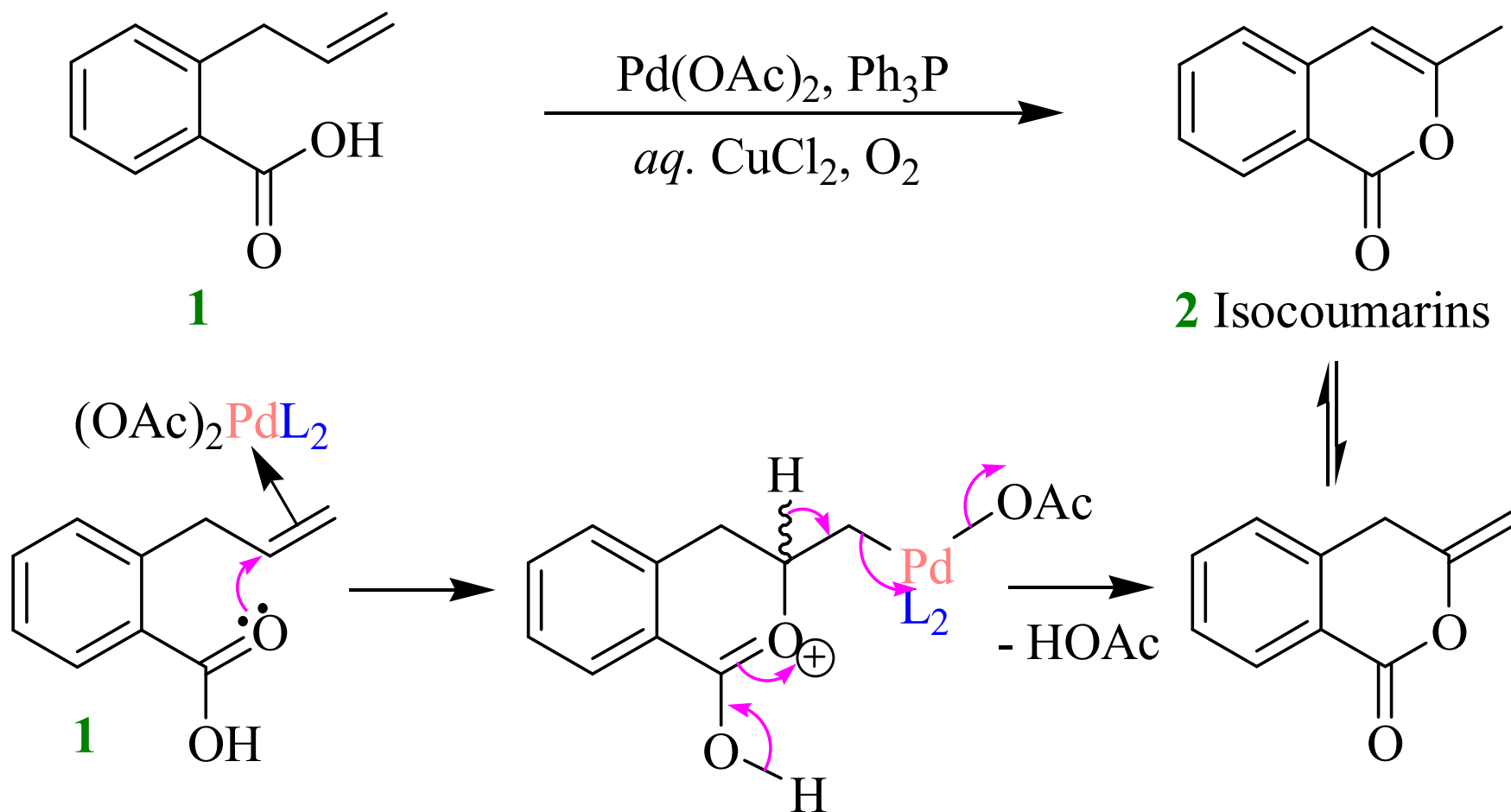
Applications of OrganoPd[II]



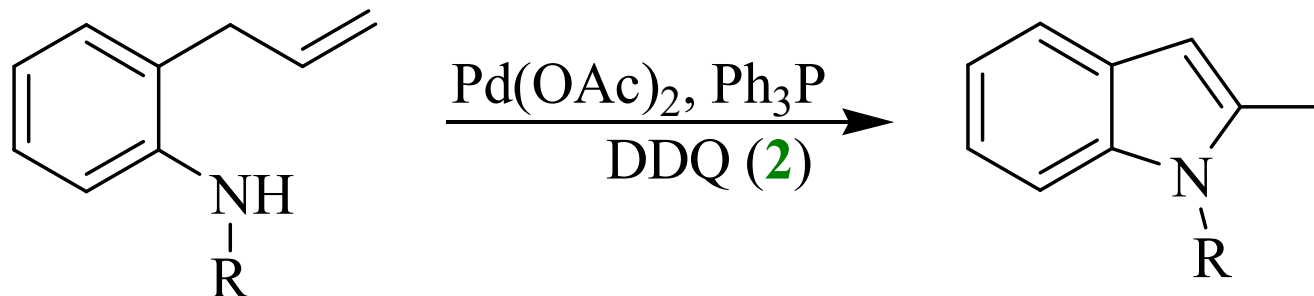
Wacker's Process



Applications of OrganoPd[II]

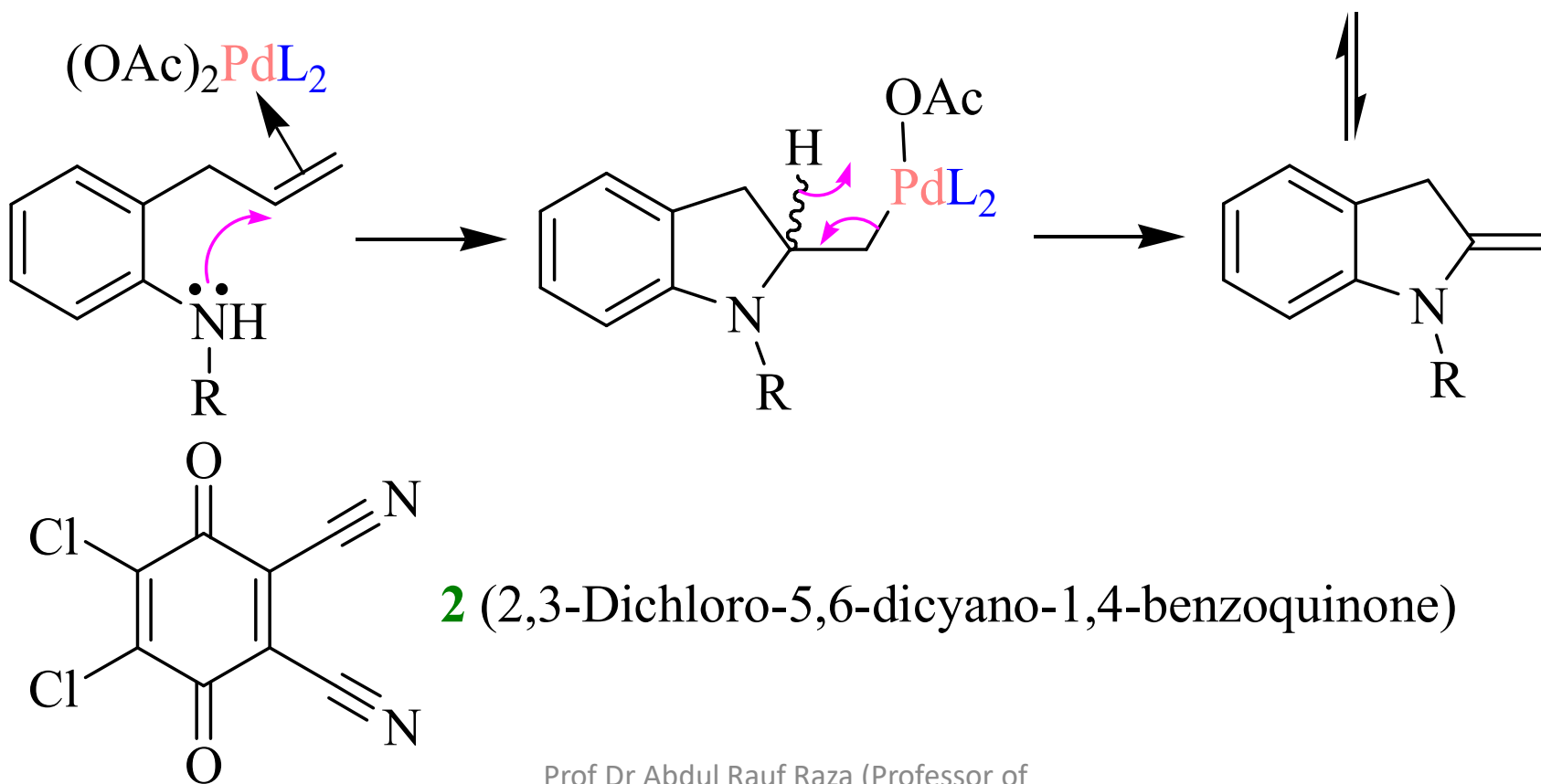


Applications of OrganoPd[II]



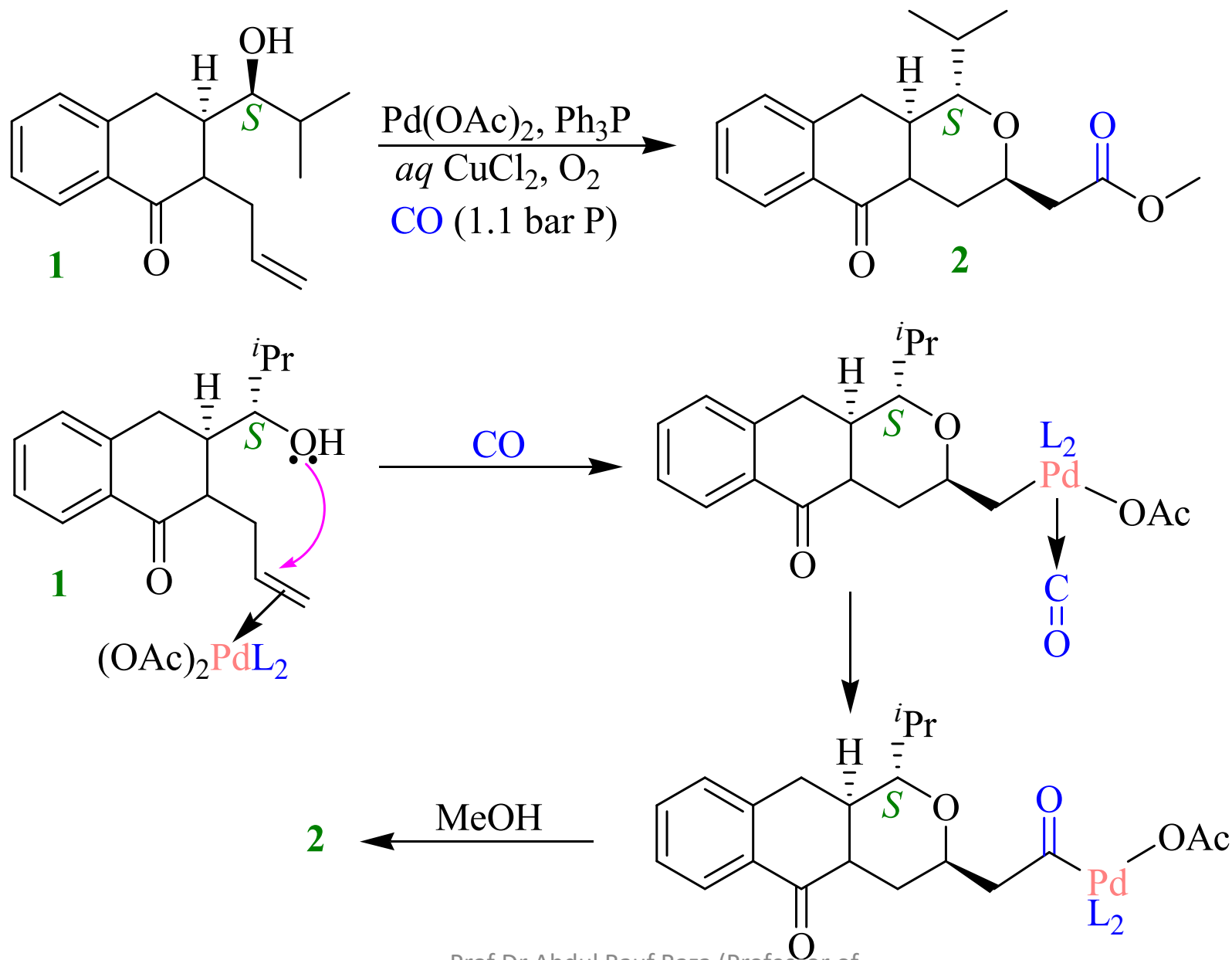
1 R = H, Ac, Ts

3 Indole (Alkaloid)

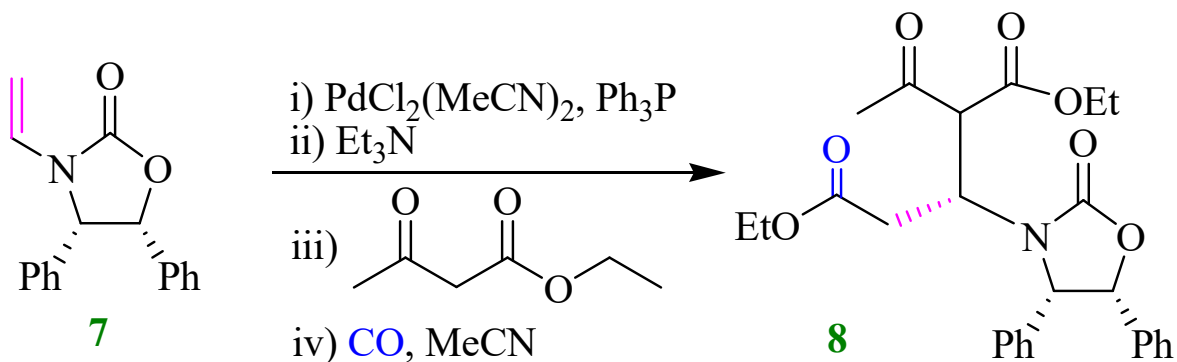
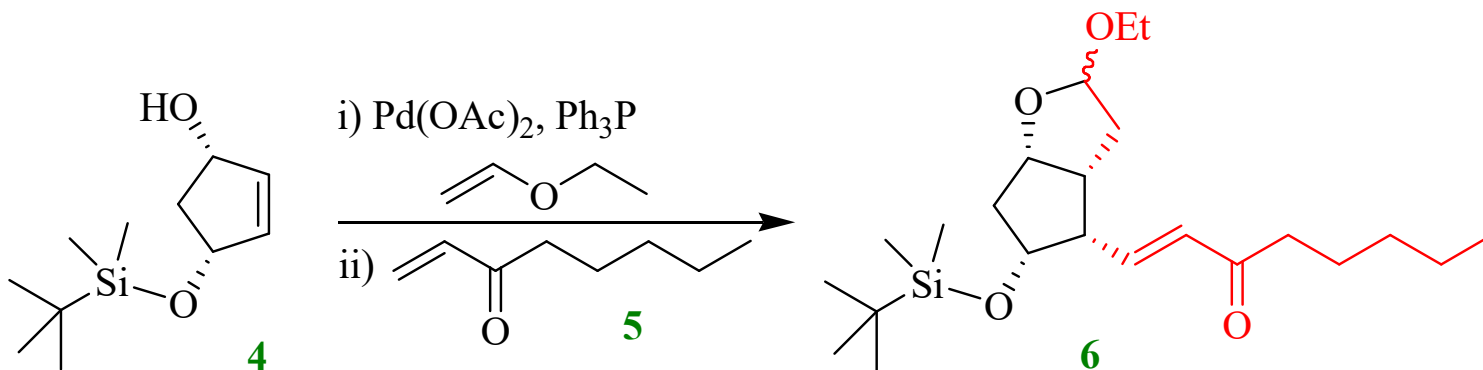
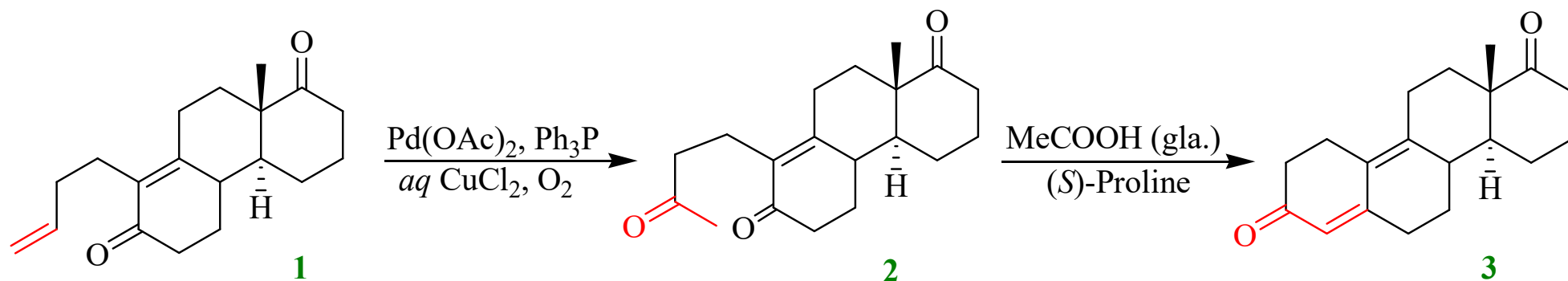


2 (2,3-Dichloro-5,6-dicyano-1,4-benzoquinone)

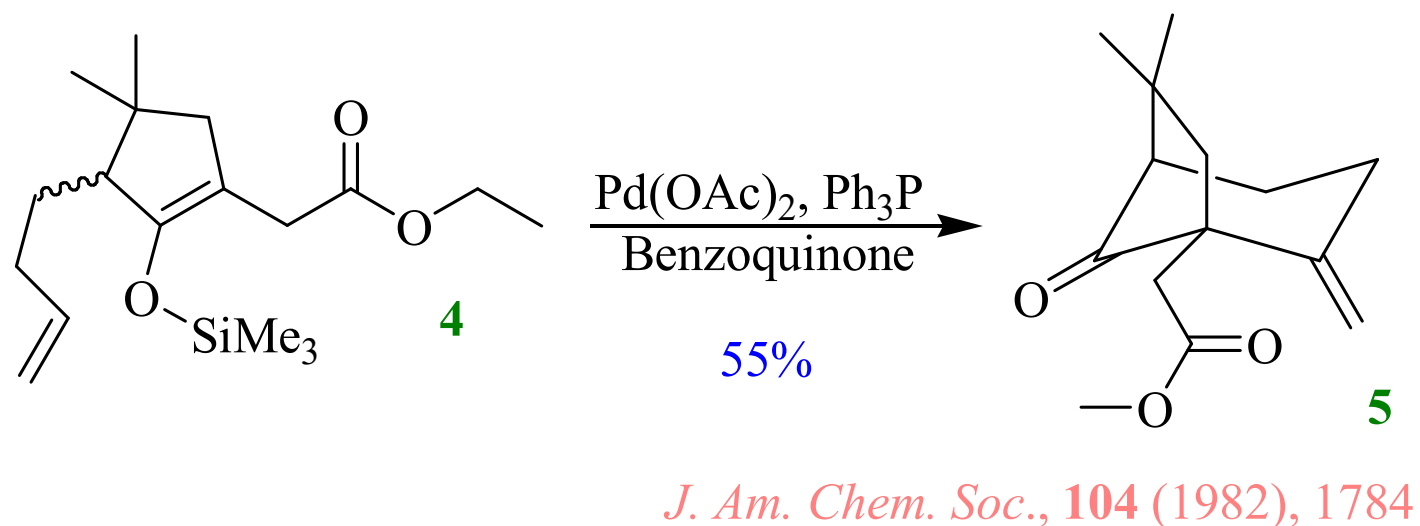
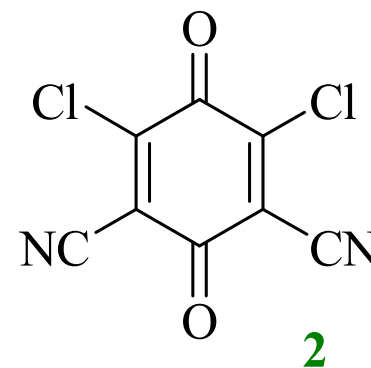
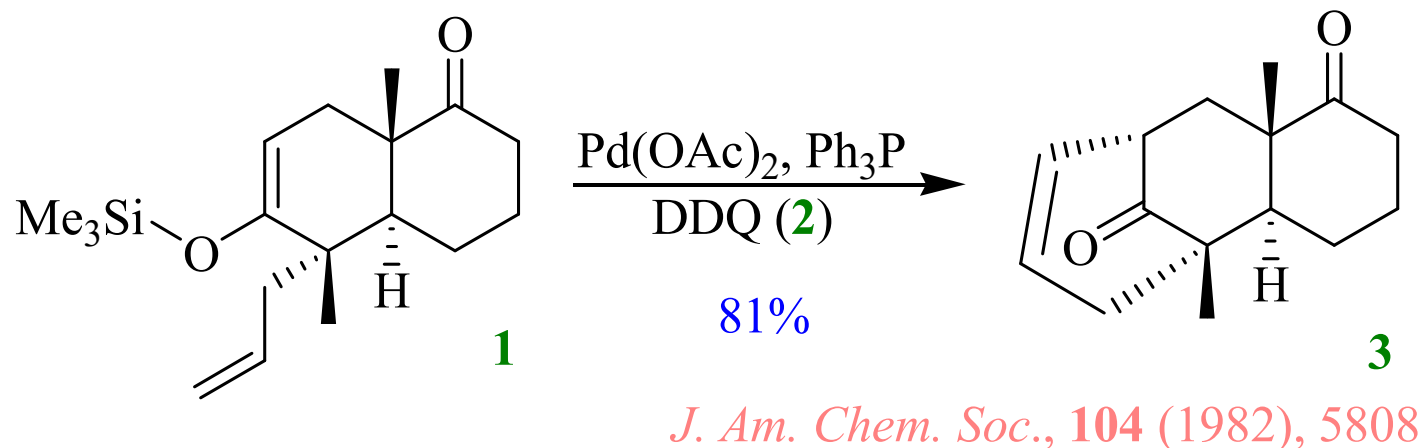
Applications of OrganoPd[II]



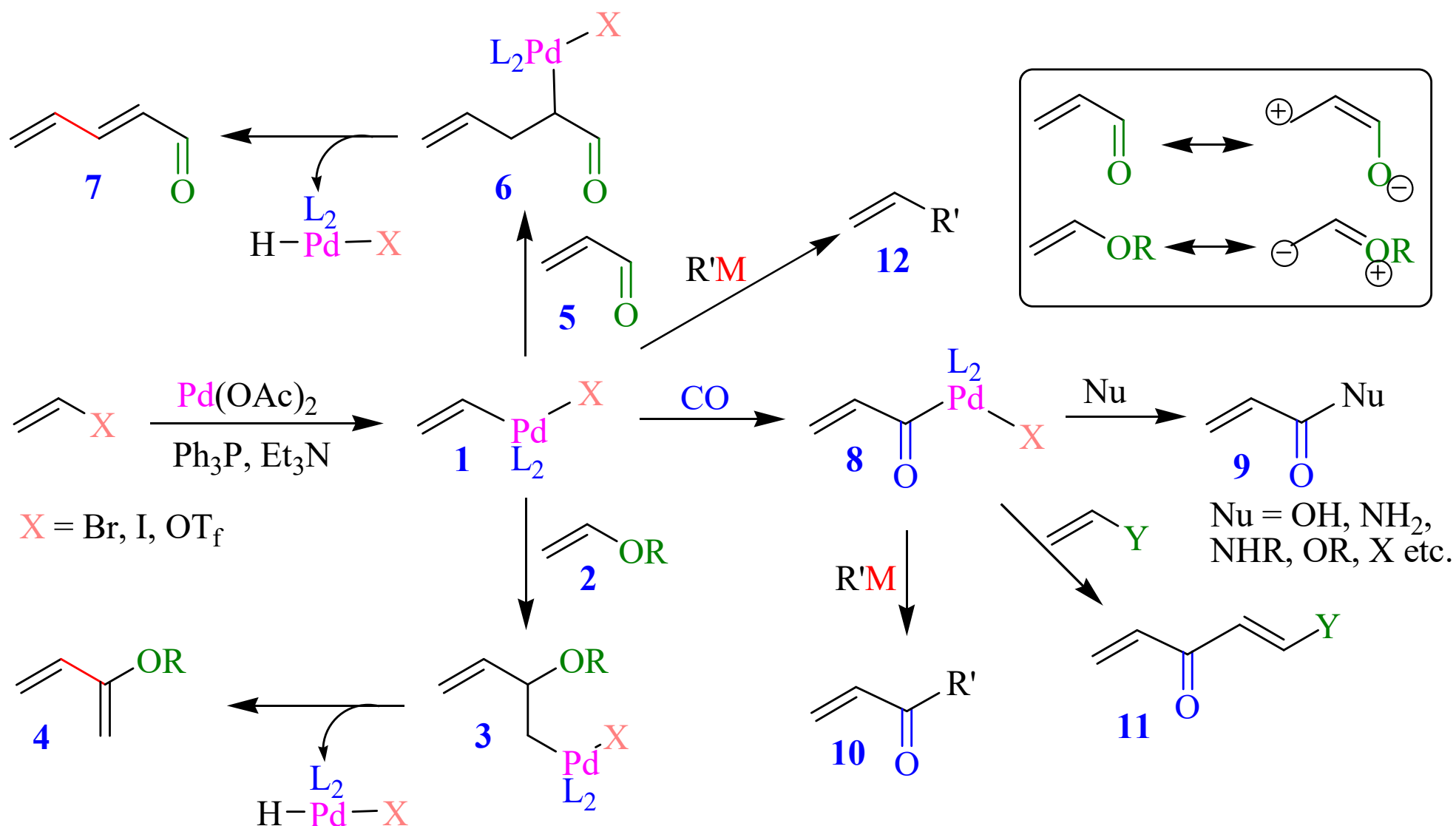
Applications of OrganoPd[II]



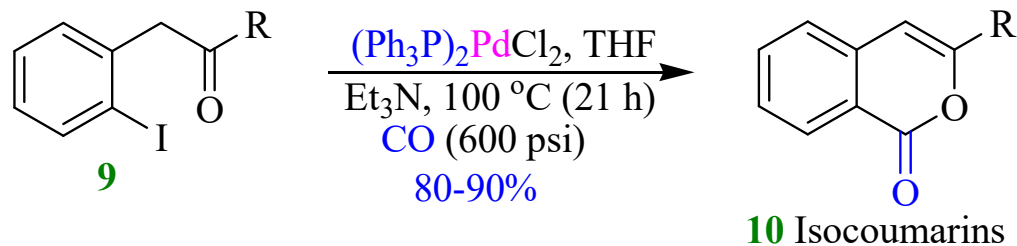
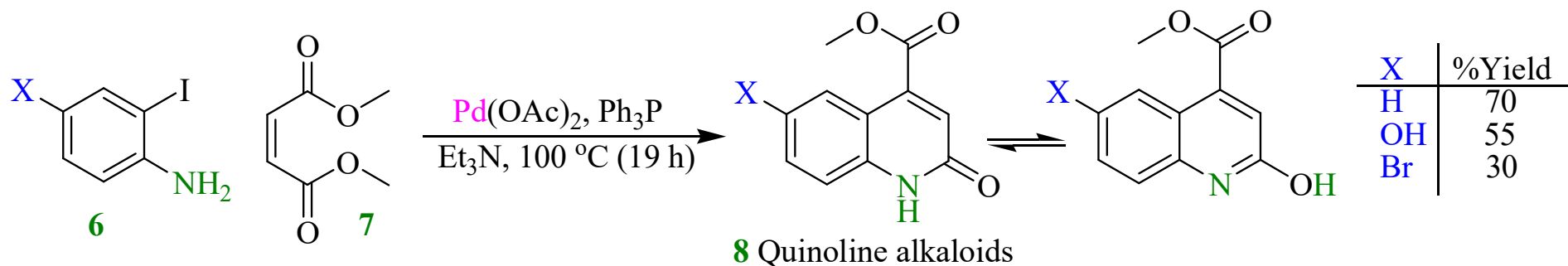
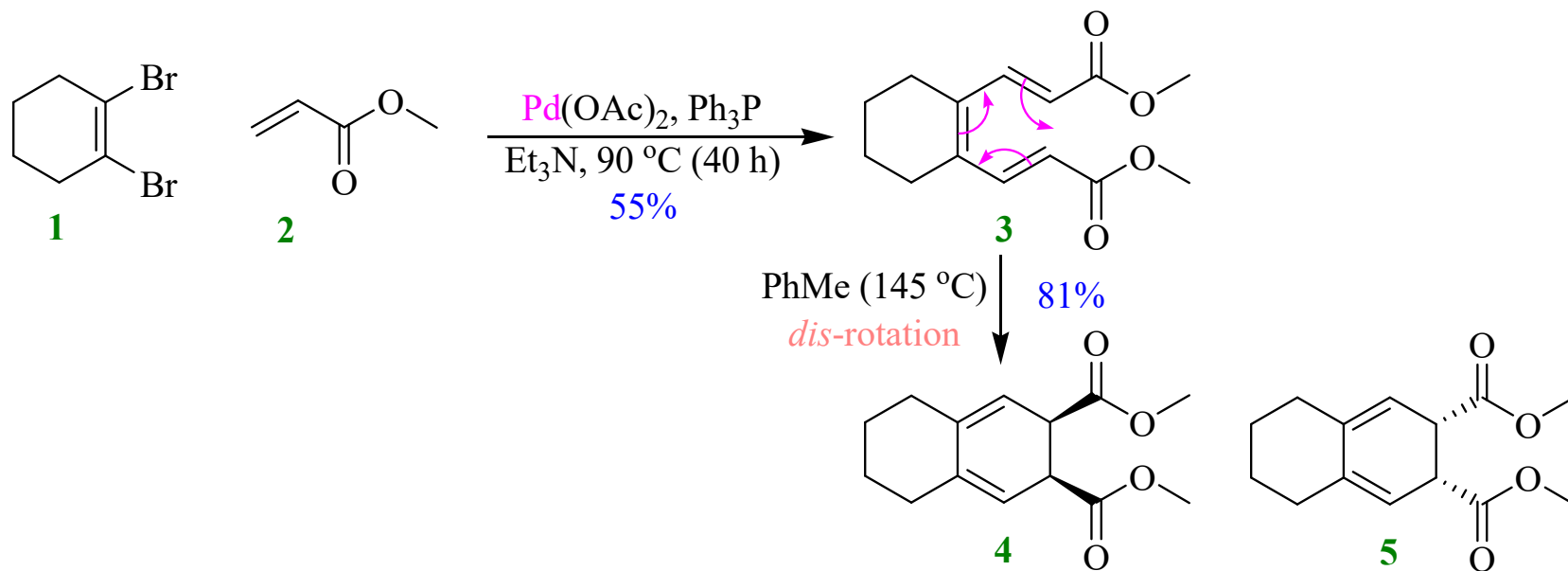
Applications of OrganoPd[II]



Pd⁰ Chemistry



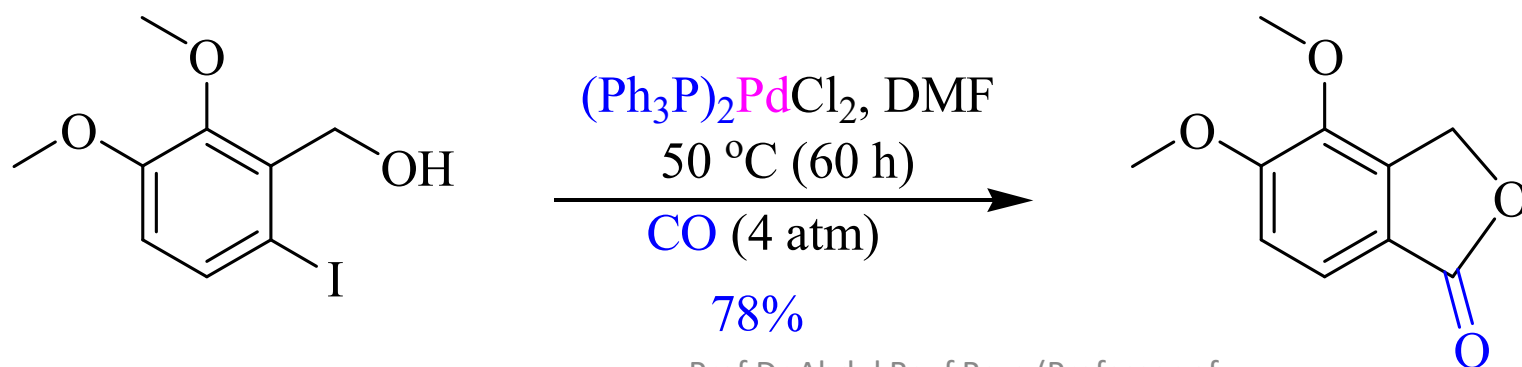
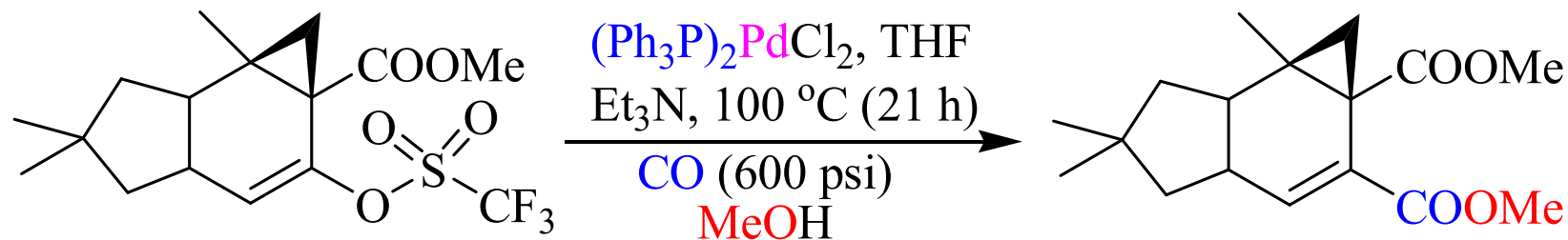
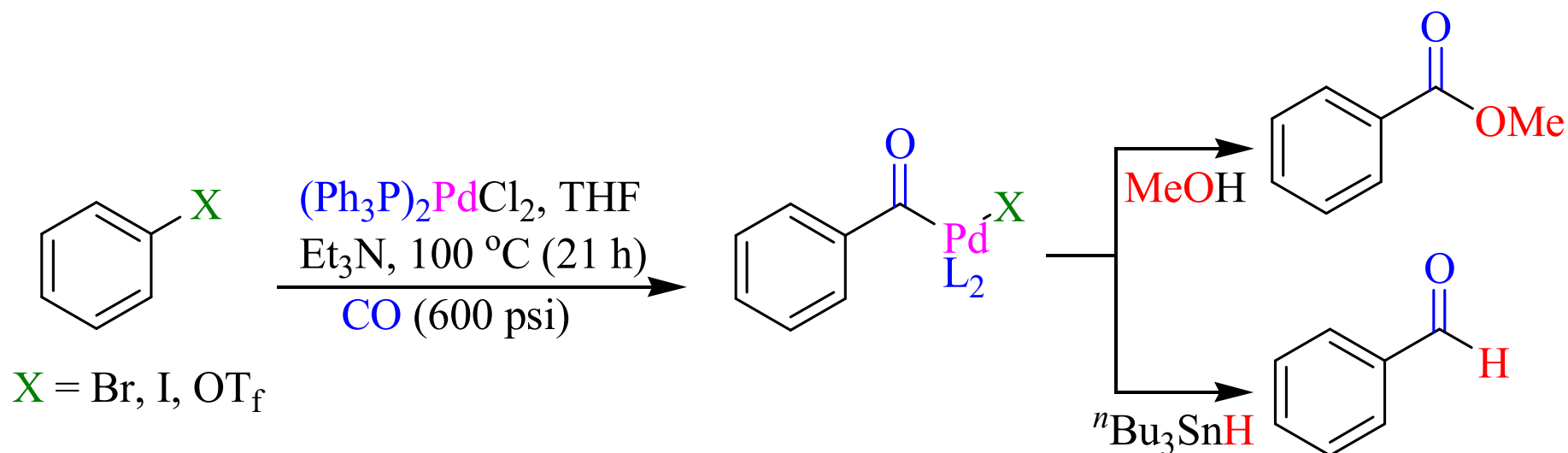
Applications of OrganoPd[0]



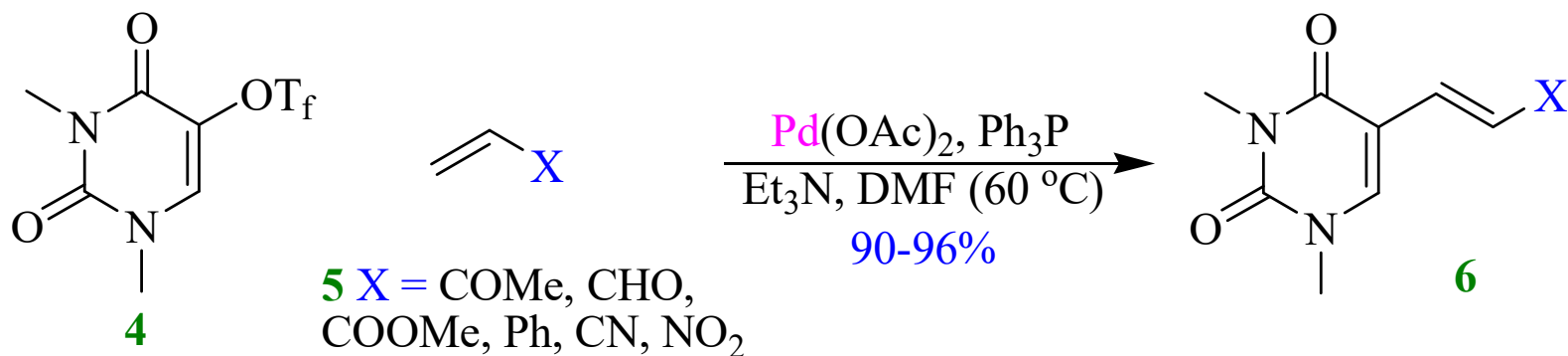
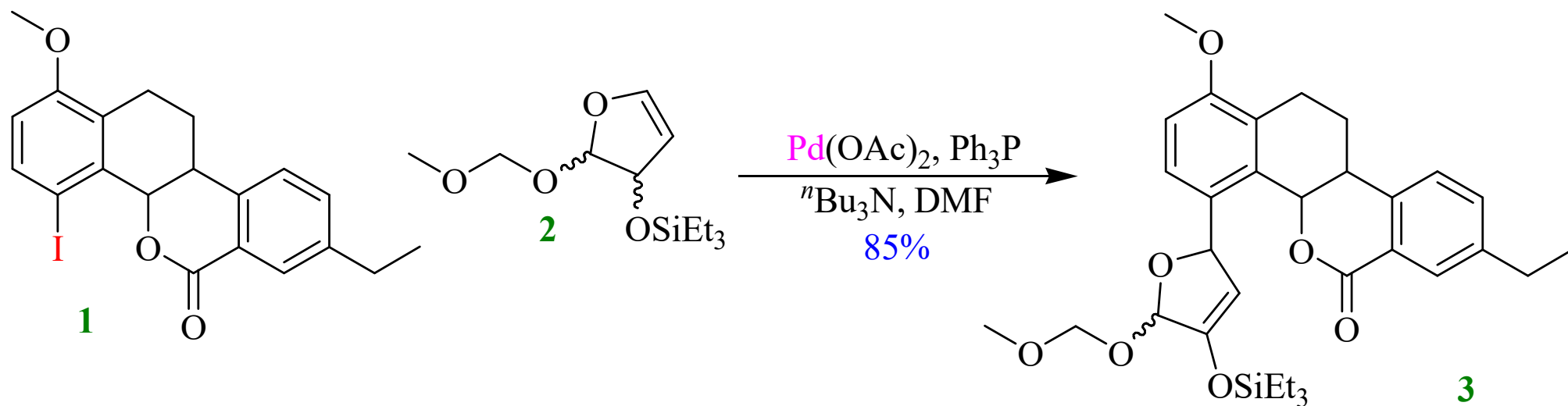
Th. Lett., 1 (1990), 2841

10 Isocoumarins

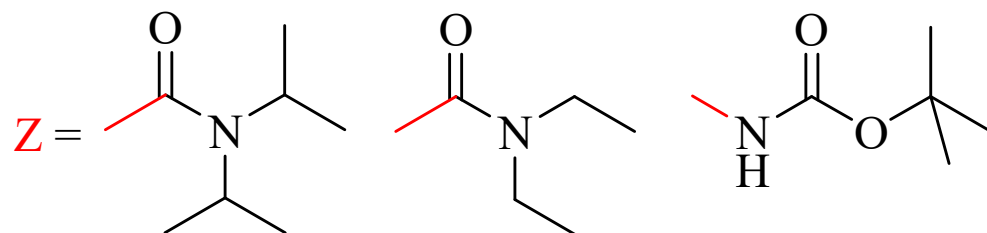
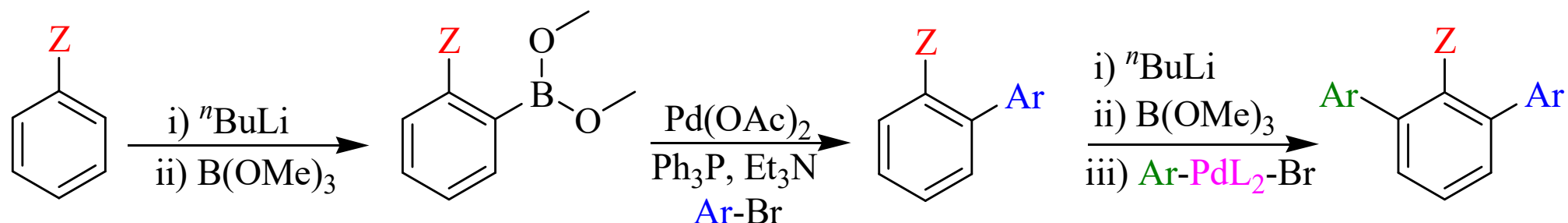
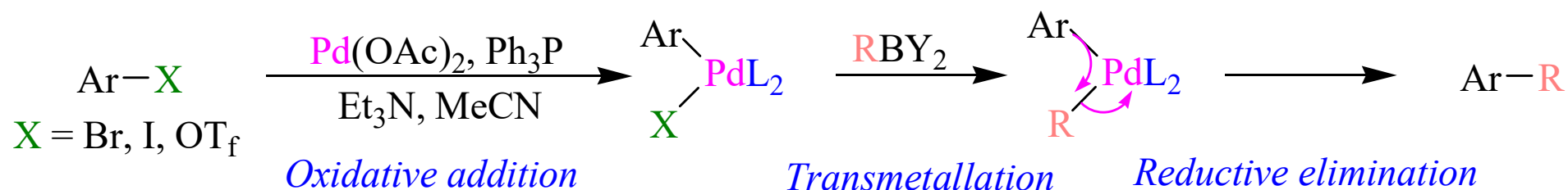
Applications of OrganoPd[0]



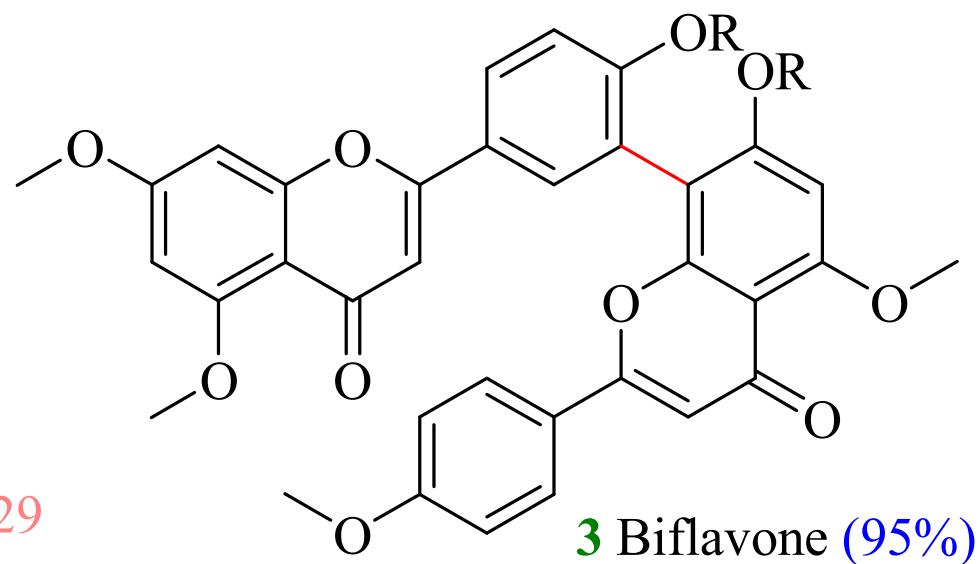
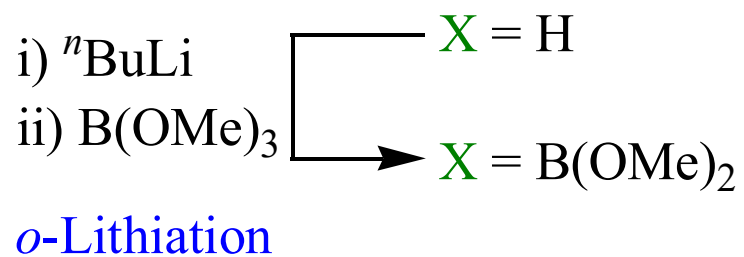
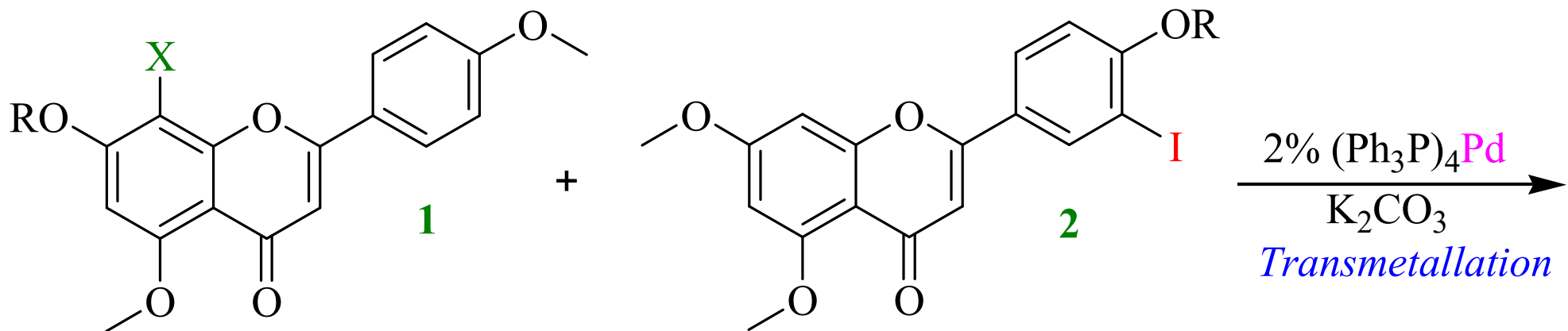
Applications of OrganoPd[0]



Suzuki Coupling

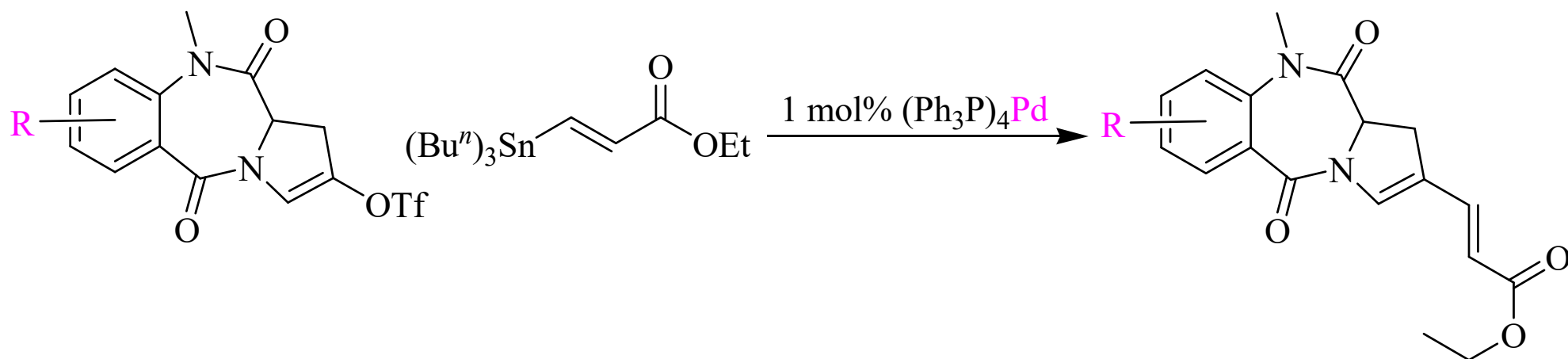
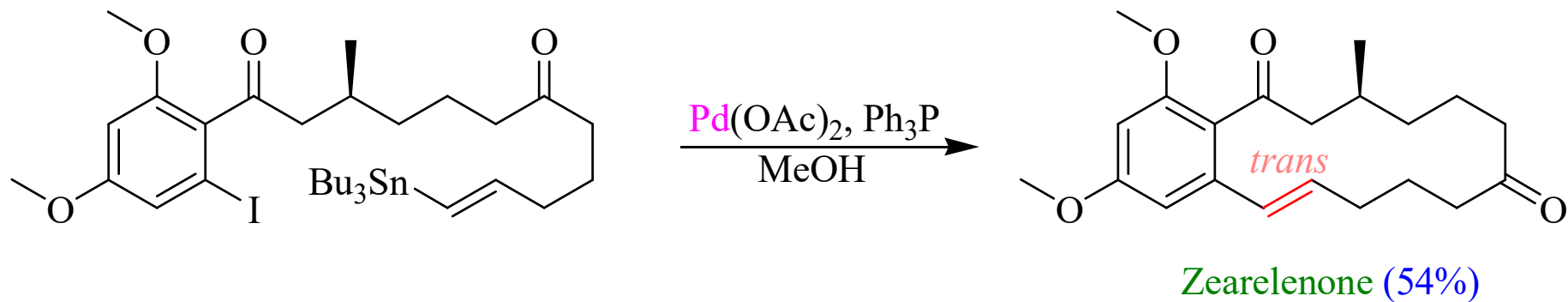


Suzuki Coupling

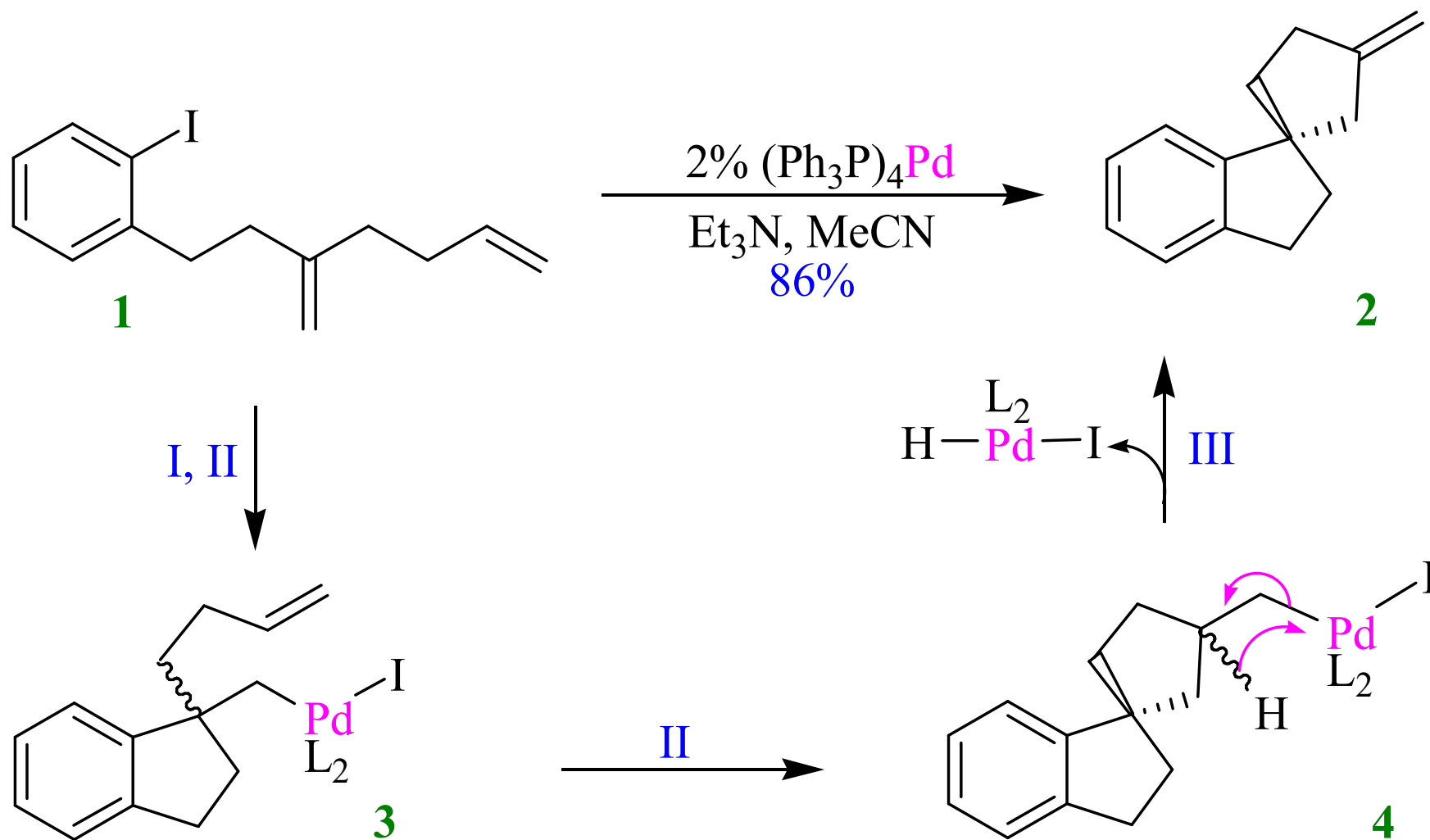


Tetrahedron Lett., 32 (1991), 2229

Stille Coupling

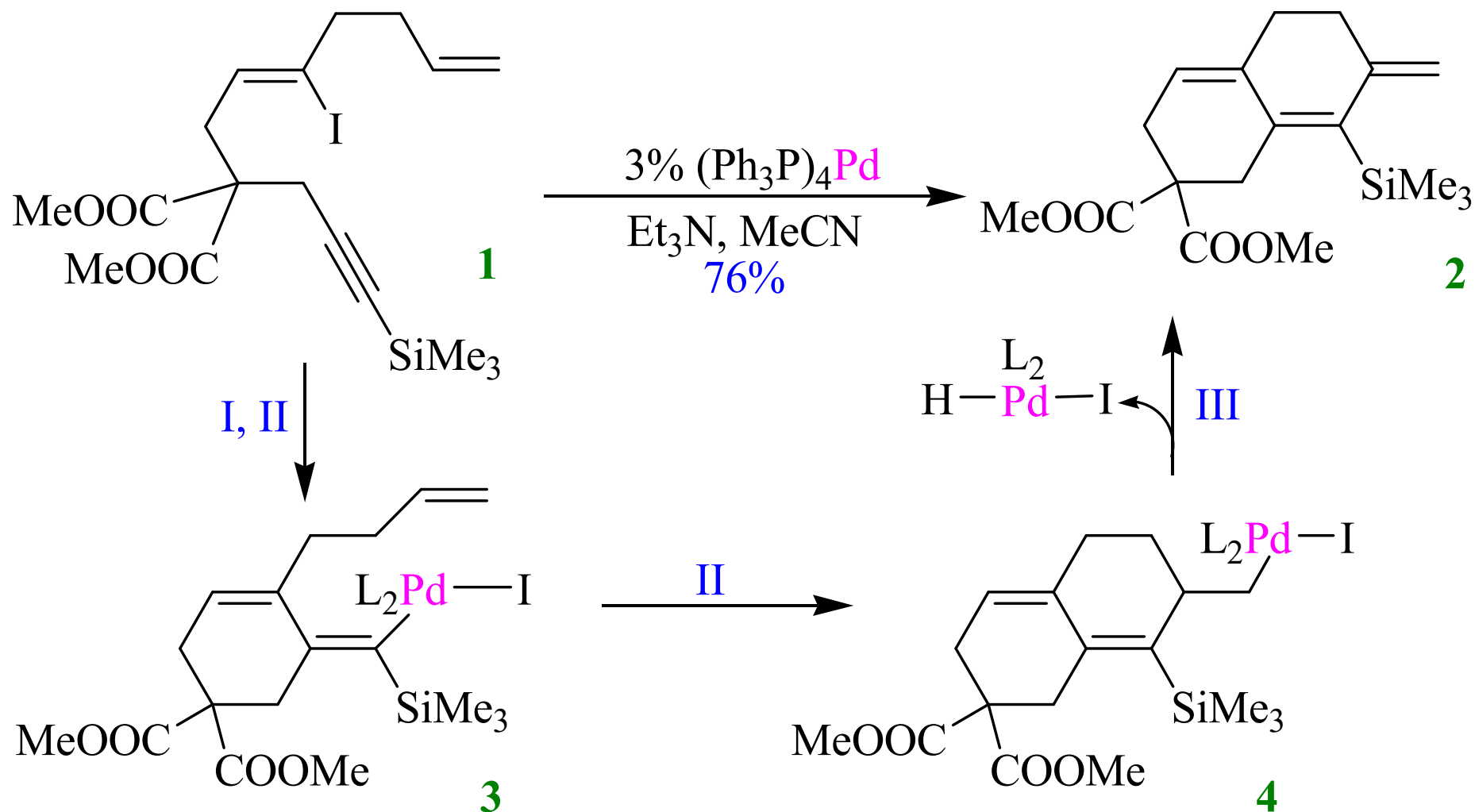


Cascade (Domino/Tandem) Cyclization



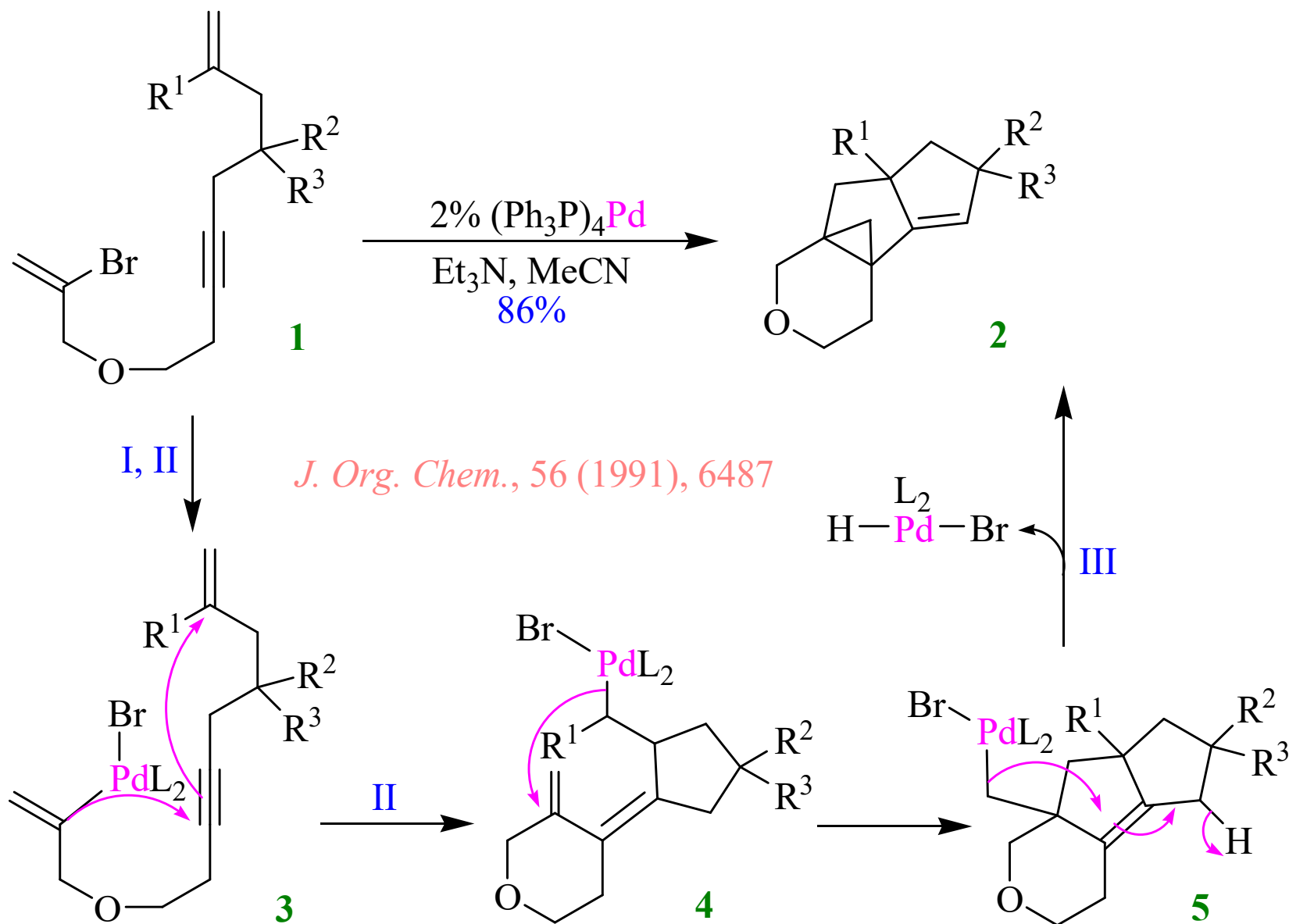
I = Oxidative addition to L_2Pd ; **II** = Addition to $\text{C}=\text{C}$, **III** = Reductive elimination

Cascade (Zipper) Cyclization



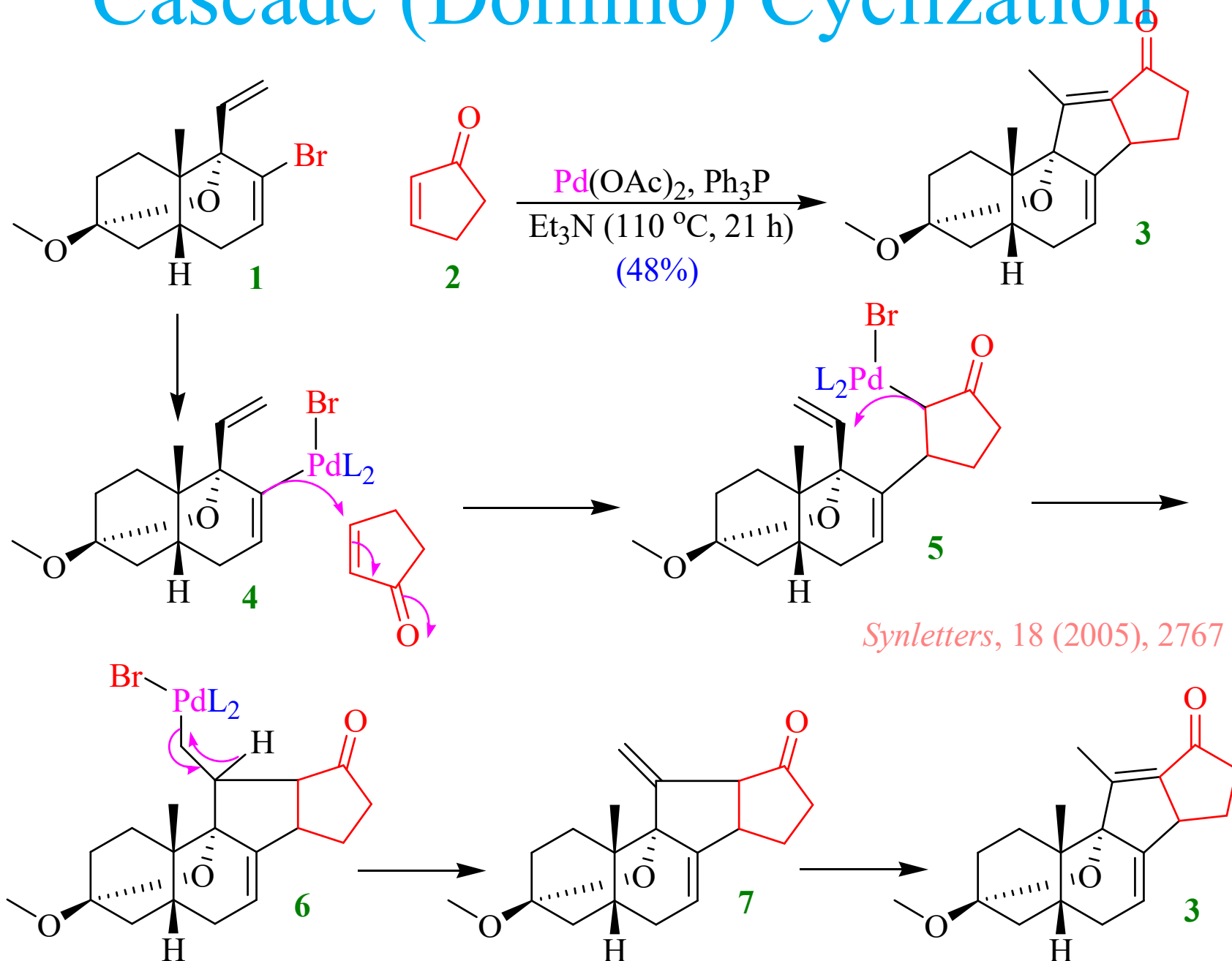
I = Oxidative addition to L_2Pd ; **II** = Addition to $\text{C}=\text{C}$ or alkyne,
III = Reductive elimination

Cascade (Tandem) Cyclization

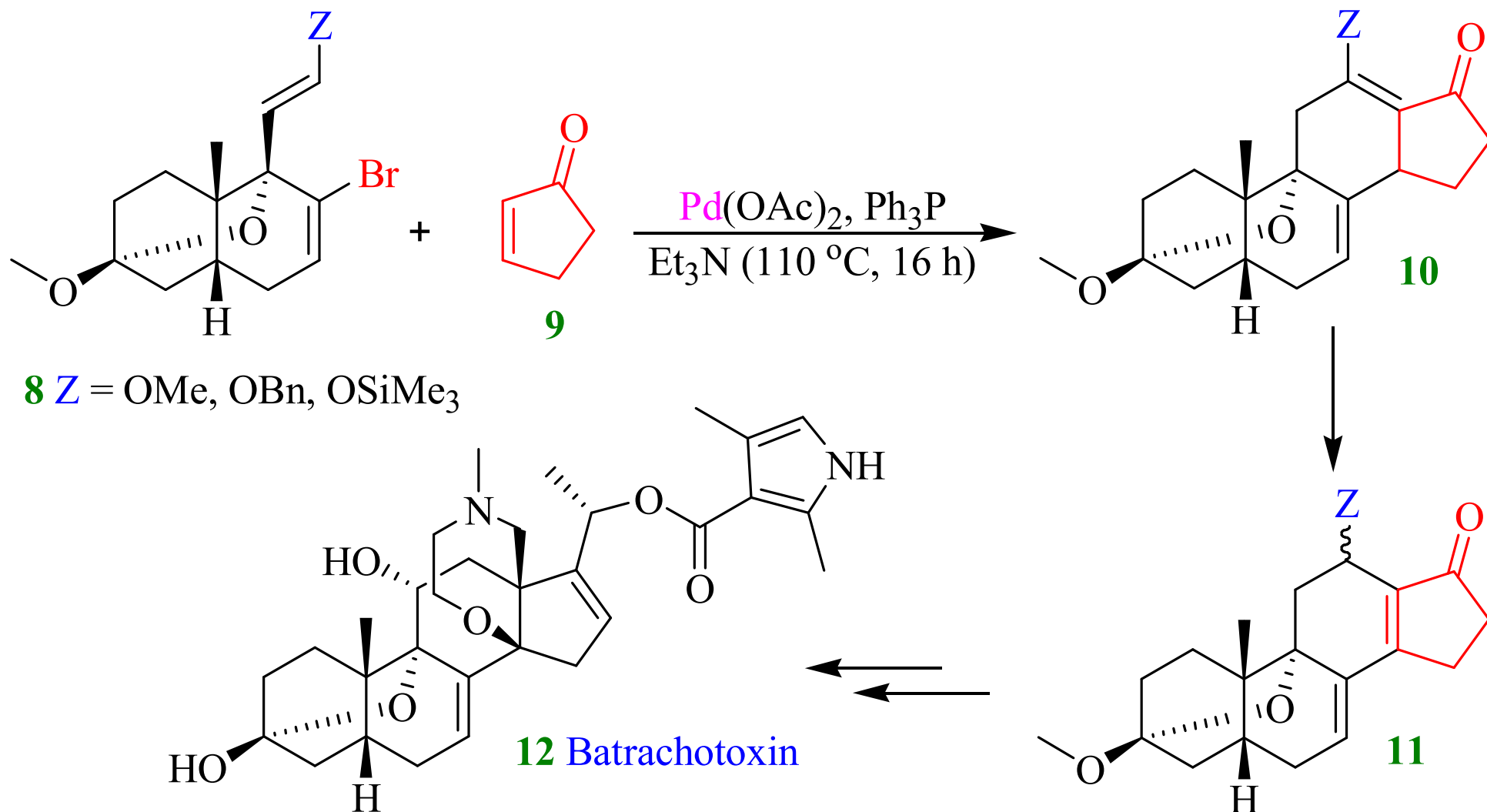


I = Oxidative addition to L_2Pd ; **II** = Addition to $\text{C}=\text{C}$; **III** = Reductive elimination

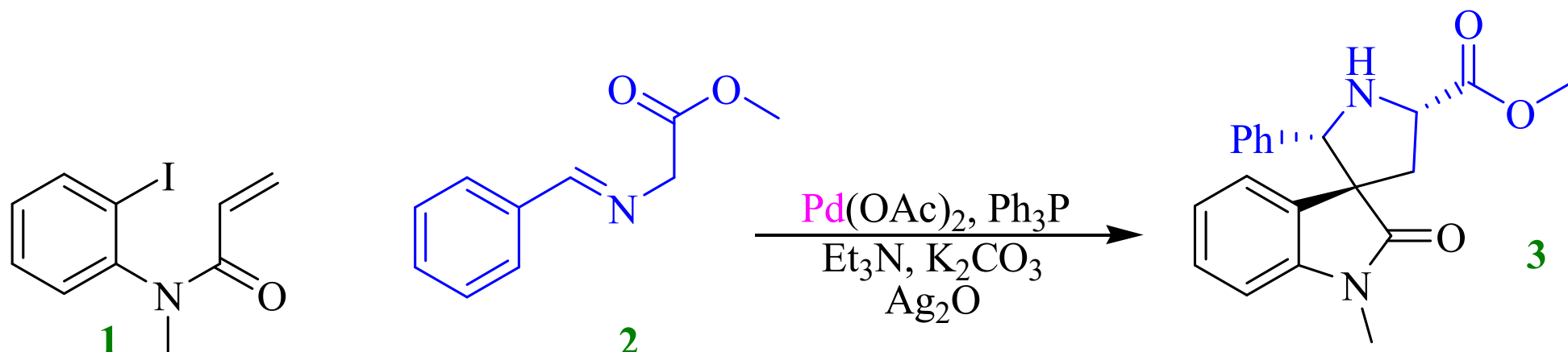
Cascade (Domino) Cyclization



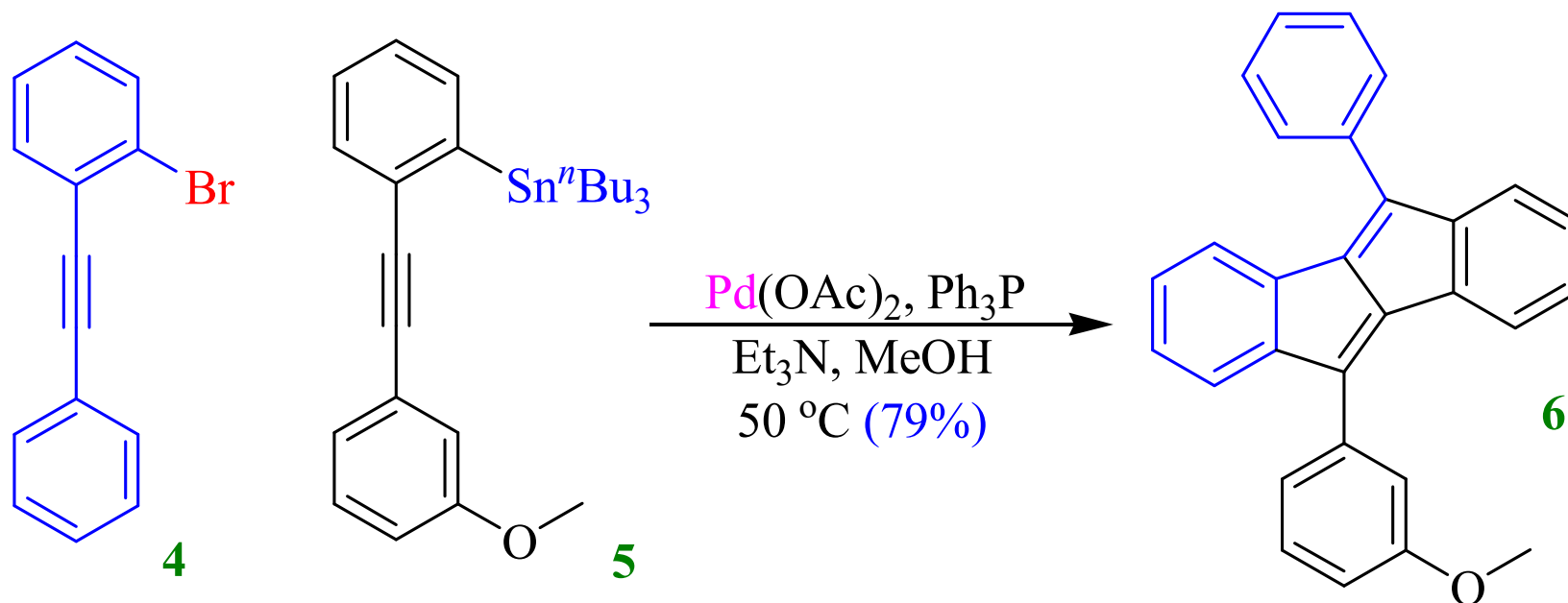
Cascade Cyclization



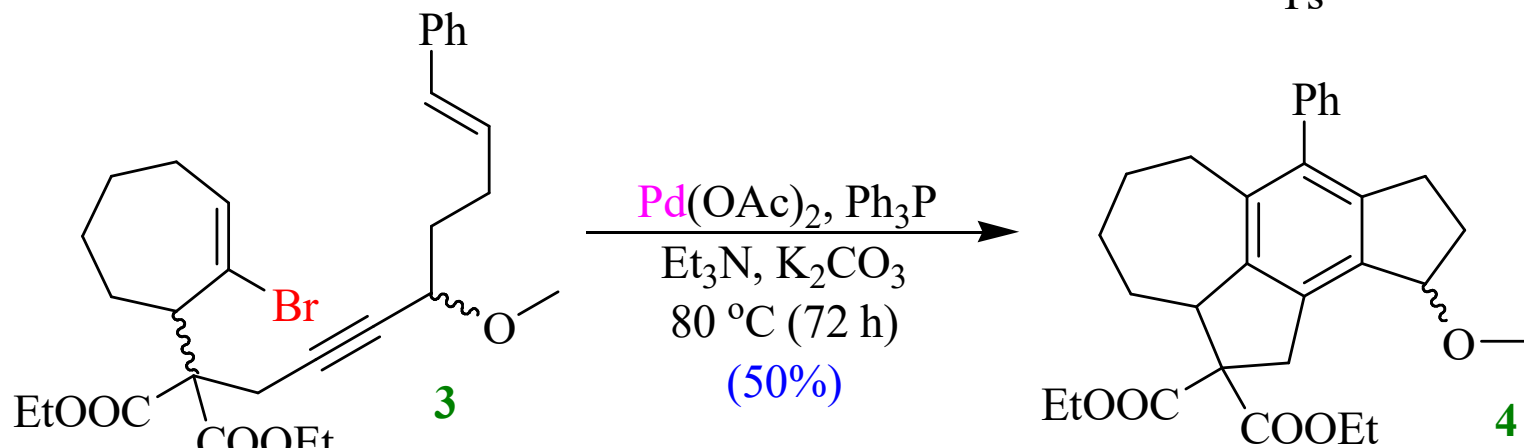
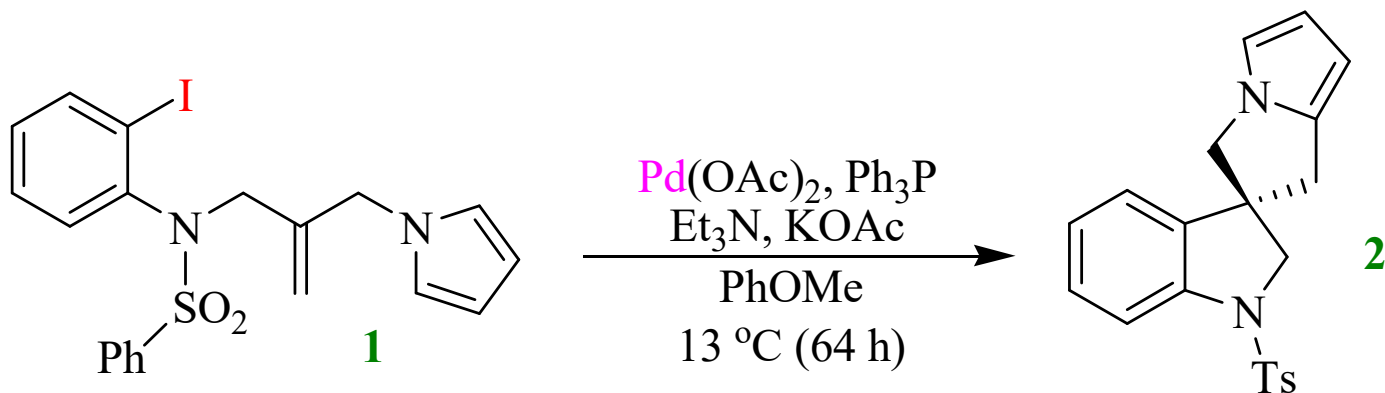
Cascade Cyclization



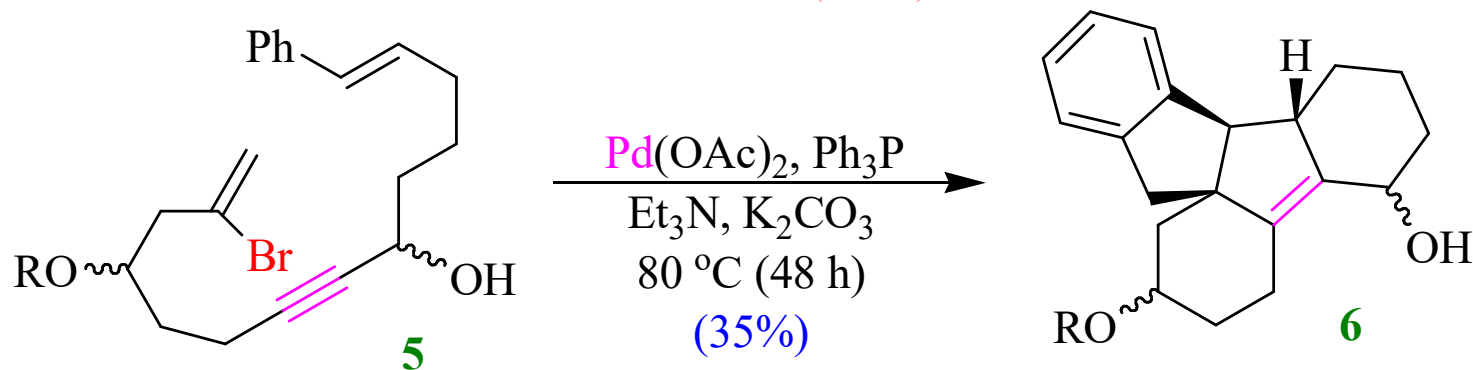
Tetrahedron Lett., 43 (2002), 2605



Cascade Cyclization



Tetrahedron Lett., 52 (1996), 11545



Angew. Chem. Int. Ed., 38 (1999), 1452
 Prof. Dr. Abdul Rauf Raza (Professor of Chemistry, University of Sargodha)