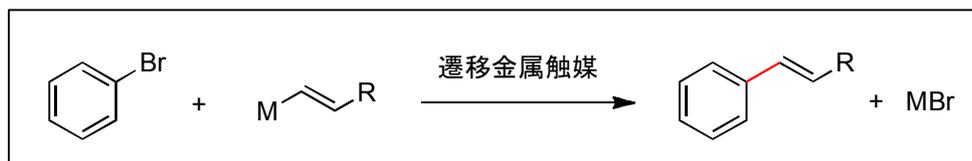
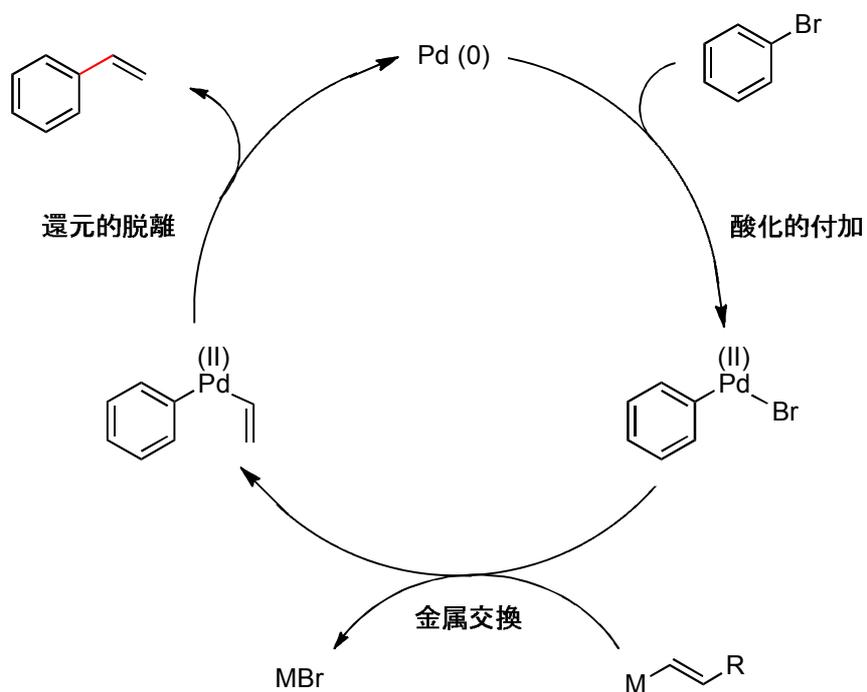


## 4. Cross-Coupling Reactions



基本的な触媒サイクル



M = MgX: Tamao-Kumada-Corriu coupling (Ni cat.)

M = ZnX: Negishi coupling

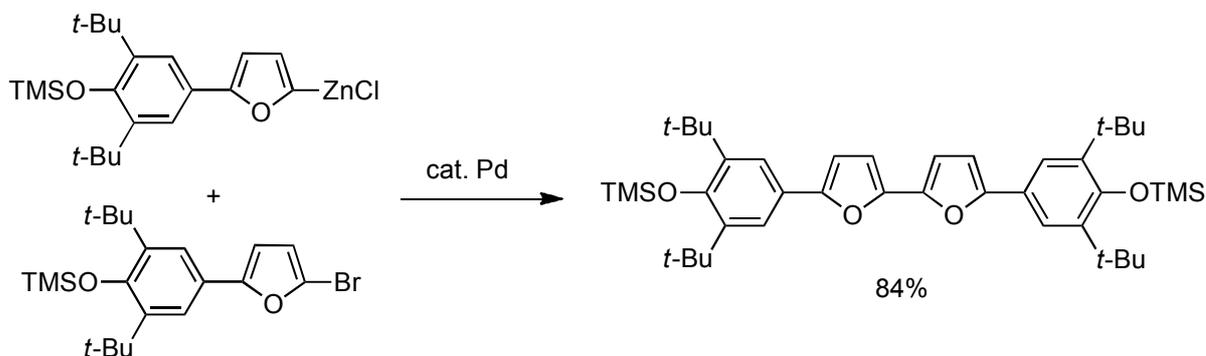
M = B(OH)<sub>2</sub>: Suzuki-Miyaura coupling

M = SnR'<sub>3</sub>: Stille coupling

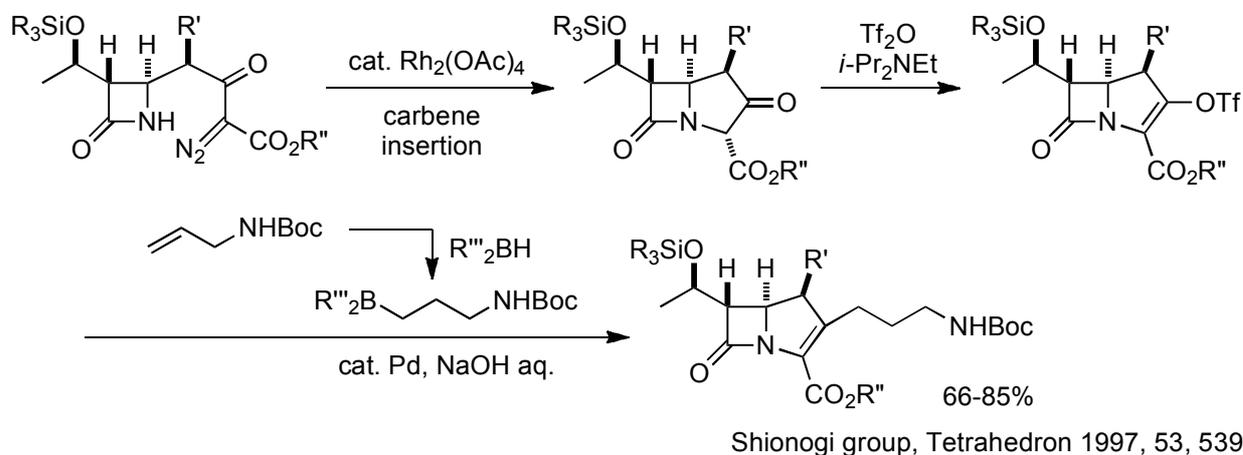
M = SiX<sub>4</sub>: Hiyama coupling

M = Cu: Sonogashira coupling (alkyne)

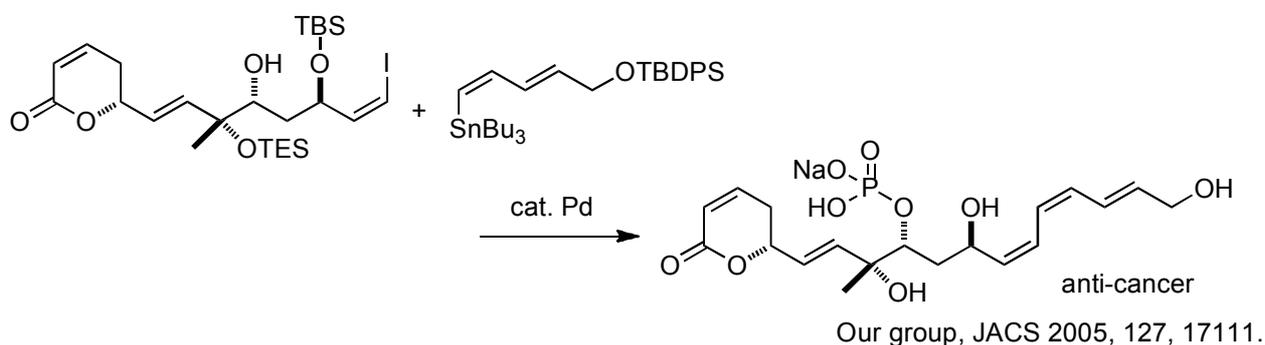
#### 4-1. 非線形光学材料合成への応用 (Negishi coupling)



#### 4-2. Carbapenem analog synthesis (Suzuki-Miyaura coupling)



#### 4-3. Fostriecin synthesis (Stille coupling)



#### 4-4. Ene-diyne natural product synthesis (Sonogashira coupling)

