Suzuki Coupling with an N-Heterocyclic Carbene–Palladium Catalyst

Significance: N-Heterocyclic carbenes (NHCs) \( \mathbf{L} \) bearing poly(ethylene glycol) chains promoted the palladium-catalyzed Suzuki–Miyaura coupling of aryl chlorides with arylboronic acids to give the corresponding biaryls in up to 96% yield (eq. 1). The borylation of aryl chlorides with \( \text{B}_2\text{pin}_2 \) also proceeded under similar catalytic conditions to afford the corresponding aryl boranes in up to 68% yield (eq. 2).

Comment: In the reaction of chlorotoluene with phenylboronic acid, the catalytic performance of \( \mathbf{L} \) (\( n \approx 17 \)) was superior to that of other NHC ligands, such as IMes or IPr, and to NHC ligands \( \mathbf{L} \) with shorter poly(ethylene glycol) chains (\( n = 0, 4, \sim 12 \)).