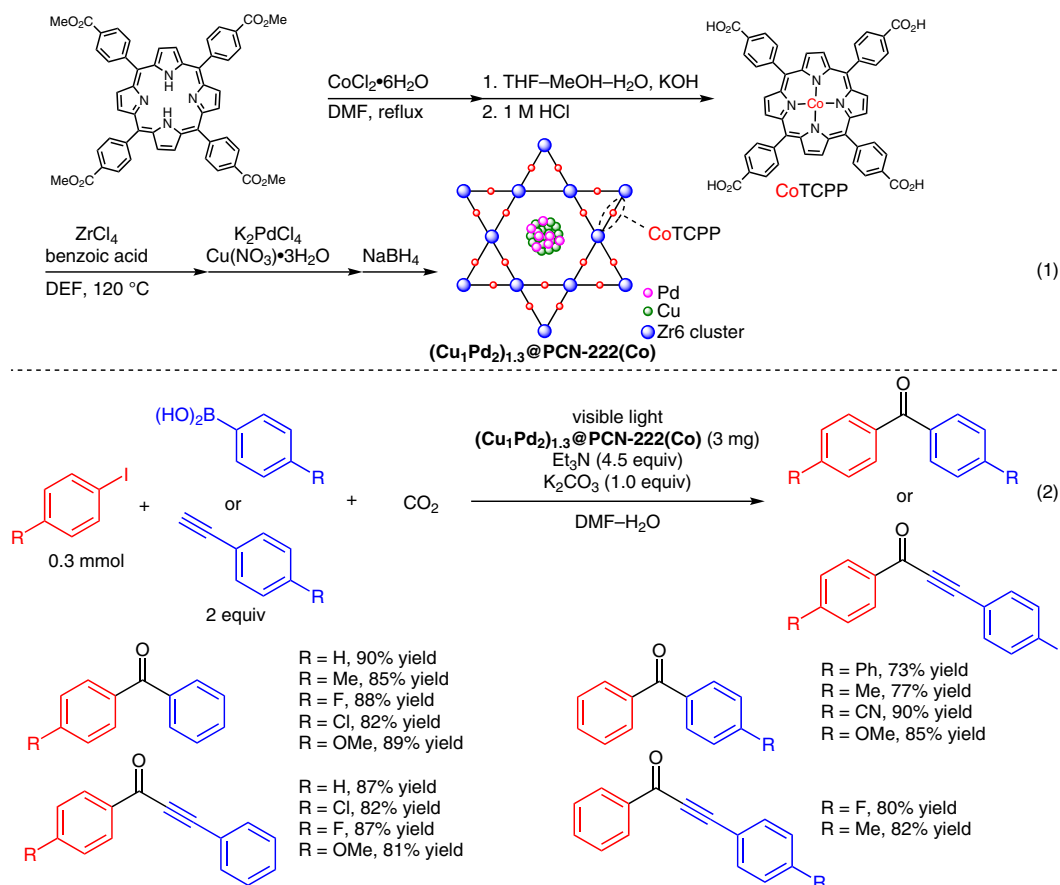


Carbonylative Suzuki–Miyaura and Sonogashira Coupling Reactions with CO₂ as a C1 Source



Significance: A porphyrin-based metal–organic framework containing cobalt, copper, and palladium [$(\text{Cu}_1\text{Pd}_2)_{1.3}@\text{PCN-222}(\text{Co})$], prepared according to Equation 1, catalyzed the carbonylative Suzuki–Miyaura coupling of aryl iodides with arylboronic acids and CO₂ as a C1 source in the presence of Et₃N and K₂CO₃ under visible-light irradiation to give the corresponding benzophenone derivatives in up to 90% yield. Similarly, arylboronic acids and alkynes underwent carbonylative Sonogashira coupling reactions to give the corresponding diaryl alkynes in up to 87% yield.

Comment: The cobalt sites of $(\text{Cu}_1\text{Pd}_2)_{1.3}@\text{PCN-222}(\text{Co})$ catalyze the photoreduction of CO₂ under visible-light irradiation to give CO, which serves as a C1 source. Under an argon atmosphere, the Suzuki–Miyaura coupling reaction of iodobenzene and phenylboronic acid gave biphenyl. In the reaction of iodobenzene with phenylboronic acid and CO₂, the catalyst was recovered and reused four times without significant loss of its catalytic activity.