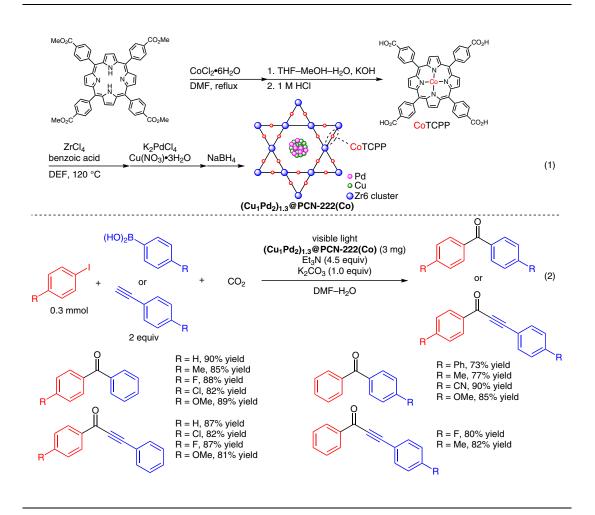
S. FU, S. YAO, S. GUO^{*}, G.-C. GUO, W. YUAN, T.-B. LU, Z.-M. ZHANG^{*} (TIANJIN UNIVERSITY OF TECHNOLOGY, P. R. OF CHINA) Feeding Carbonylation with CO₂ via the Synergy of Single-Site/Nanocluster Catalysts in a Photosensitizing MOF *J. Am. Chem. Soc.* **2021**, *143*, 20792–20801, DOI: 10.1021/jacs.1c08908.

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 [(Cu_1Pd_2)_{1.3}@PCN-222(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 aralkynes underwent carbonylative Sonogashira coupling reactions to give the corresponding diaryl alkynes in up to 87% yield. **Comment:** The cobalt sites of (**Cu**₁**Pd**₂)_{1.3}@**PCN**-**222(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.

Category

Polymer-Supported Synthesis

Key words

carbonylation

Suzuki–Miyaura coupling

Sonogashira coupling

carbon dioxide

photocatalysis

metal–organic framework



SYNFACTS Contributors: Yasuhiro Uozumi, Shintaro Okumura Synfacts 2022, 18(03), 0297 Published online: 16.02.2022 **DOI:** 10.1055/s-0041-1737364; **Reg-No.:** Y00322SF