

Copper-doped palladium and platinum catalysts for selective hydrogenation of diphenylacetylene

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Experiment. 1100 mg of diphenylacetylene were dissolved in 10 ml of DMF. One ml of the solution, a magnetic stirrer, and 1.5 mg of the catalyst corresponding to the experiment were added to nine 1.5 ml vials:

- 1) Cu₂O (NPs) 1.5 mg
- 2) Pd₂dba₃ 1.5 mg
- 3) Pt₂dba₃ 1.5 mg
- 4) Cu₂O (NPs) 0.3 mg : 4Pd₂dba₃ 1.2 mg
- 5) Cu₂O (NPs) 0.3 mg : 4Pt₂dba₃ 1.2 mg
- 6) Cu₂O (NPs) 0.5 mg: 2Pd₂dba₃ 1.0 mg
- 7) Cu₂O (NPs) 0.5 mg: 2Pt₂dba₃ 1.0 mg
- 8) Cu₂O (NPs) 0.75 mg: Pd₂dba₃ 0.75 mg
- 9) Cu₂O (NPs) 0.75 mg: Pt₂dba₃ 0.75 mg

All vials were placed in an autoclave, pressurized with hydrogen at 10 bar, and stirred at 550 rpm at room temperature. Aliquots were taken after 30 and 60 min for ¹H NMR spectroscopy in DMSO-*d*₆.

The sample morphology was studied using a Hitachi HT7700 transmission electron microscope. The images were acquired in bright-field TEM mode at a 100 kV accelerating voltage. The X-ray photoelectron spectroscopy (XPS) measurements of Pd/C were carried out by using an OMICRON ESCA+ system at an 8×10⁻¹⁰ mbar pressure and 20 eV transmission energy, with the Mg anode as the source of radiation at a 1253.6 eV radiation energy and a power of 252 W. NMR spectra were recorded using Bruker Fourier 300 HD spectrometer and Bruker DRX 500 at frequencies of 300.1 MHz (¹H) and 500.1 MHz (¹H). The residual solvent peak was used as an internal standard for ¹H (DMSO-*d*₆ 2.50 ppm). Cyclic voltammograms were recorded using a BASi Epsilon Eclipse potentiostat (USA). The device includes a measuring unit, a DellOptiplex 320 personal computer with Epsilon-EC-USB-V200 software. 0.1 M Bu₄NBF₄ was used as a supporting electrolyte. A glassy carbon electrode modified with carbon paste (surface area 3 mm²) served as the working electrode. Ag/AgCl (0.01 M KCl) was used as a reference electrode. A platinum wire was used as an auxiliary electrode. The scanning rate was 100 mV s⁻¹. Measurements were carried out in a thermostatted electrochemical cell (volume 5 ml) in an inert gas atmosphere (Argon). Between measurements or before recording the voltammetric wave, the aqueous solution was actively stirred with a magnetic stirrer in an atmosphere of constant inert gas flow.

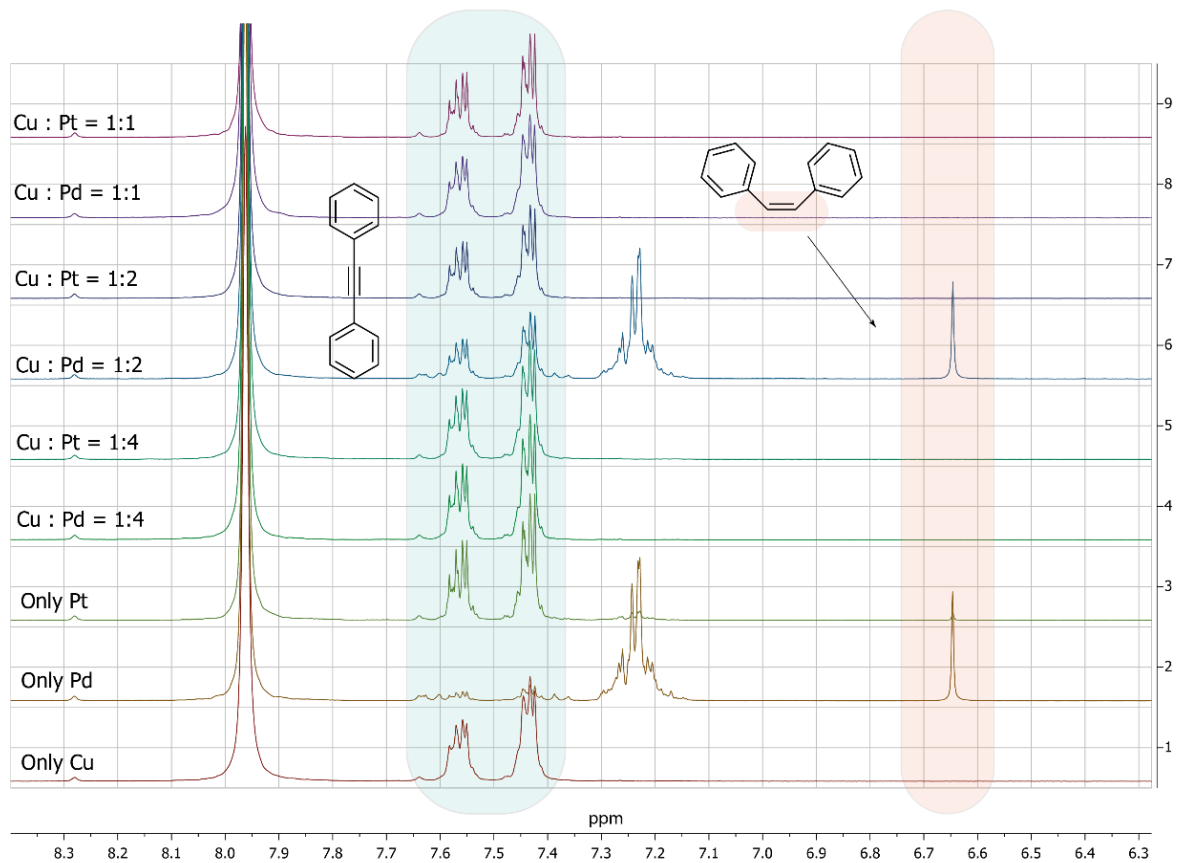


Figure S1 ^1H NMR spectrum of the reaction system after 30 min.

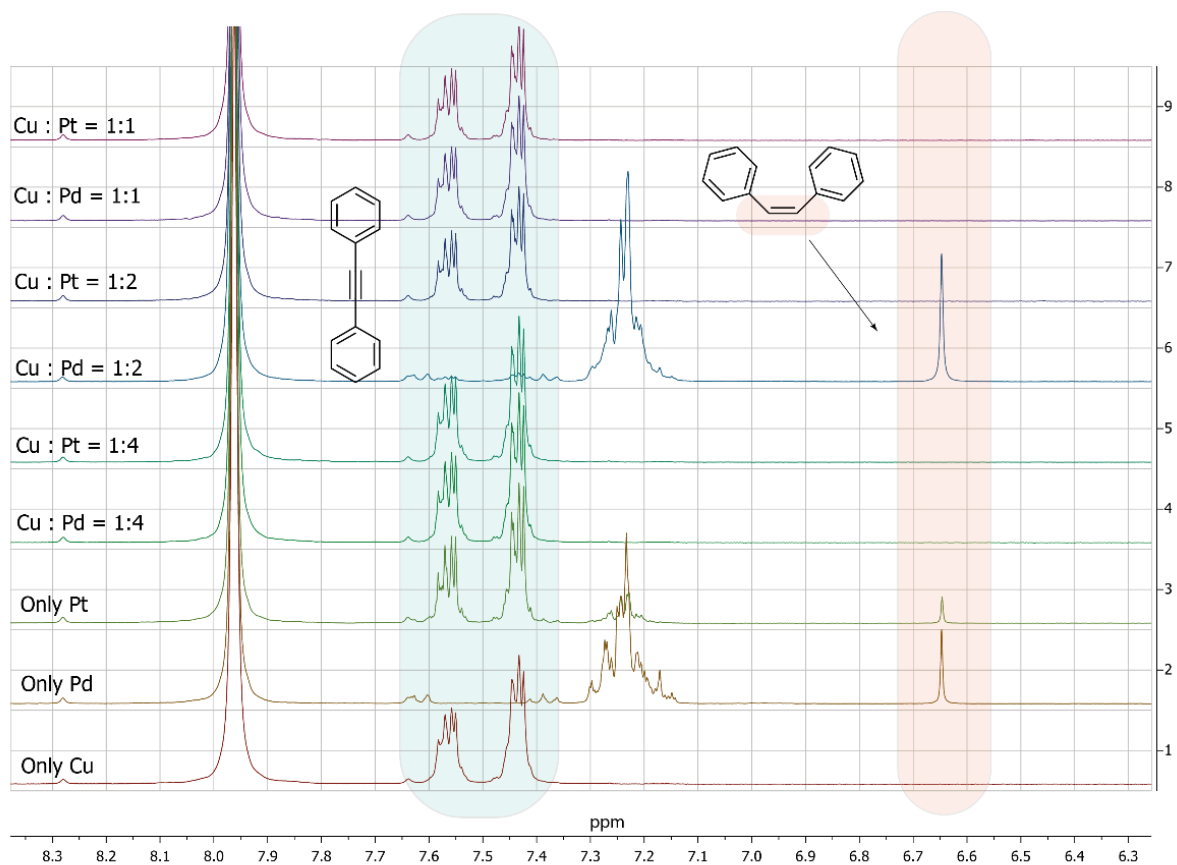


Figure S2 ^1H NMR spectrum of the reaction system after 60 min.

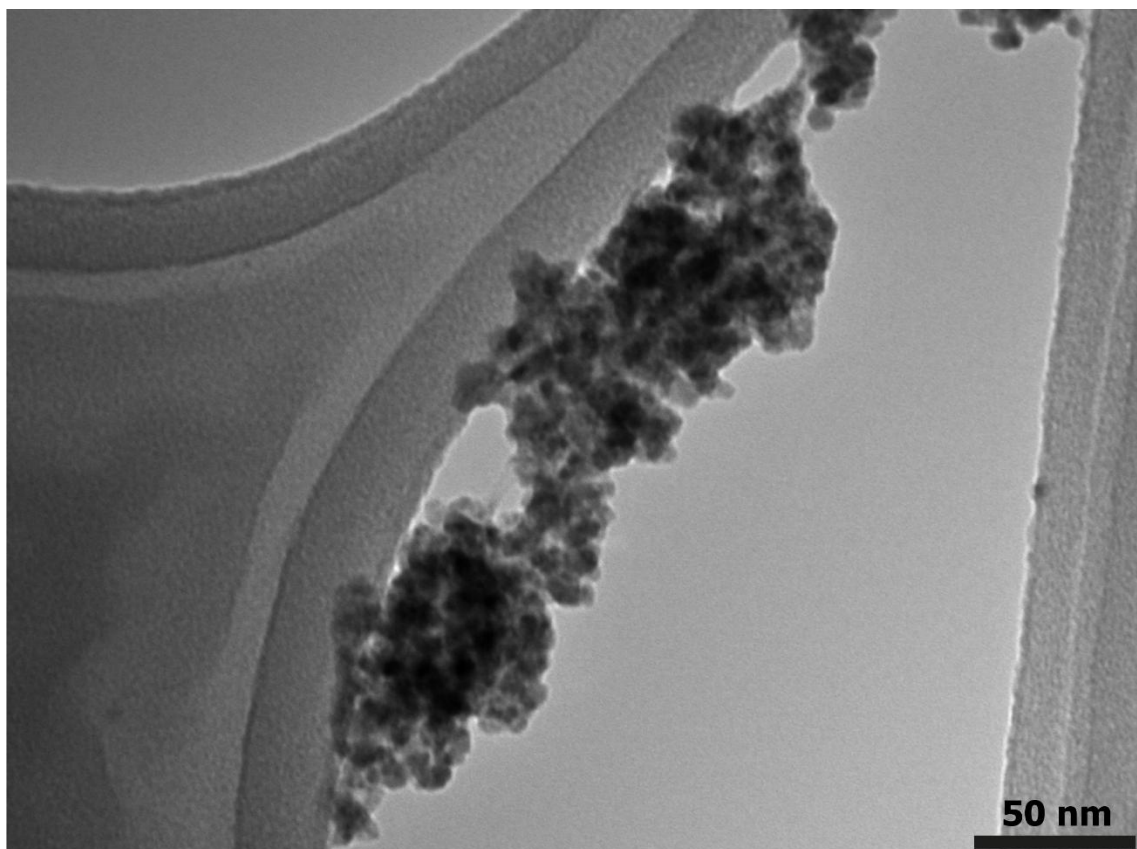


Figure S3 TEM image of Cu₂O nanoparticles.

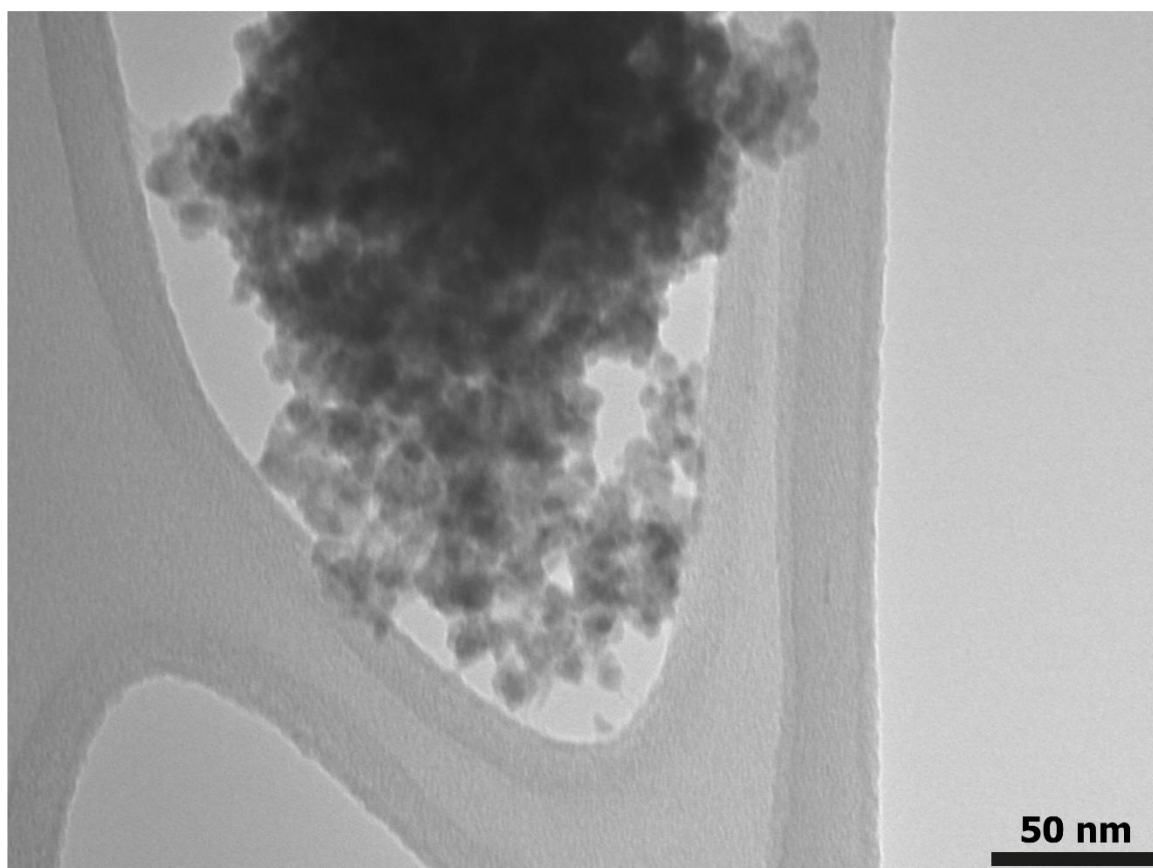


Figure S4 TEM image of Cu₂O nanoparticles.