

Supporting Information

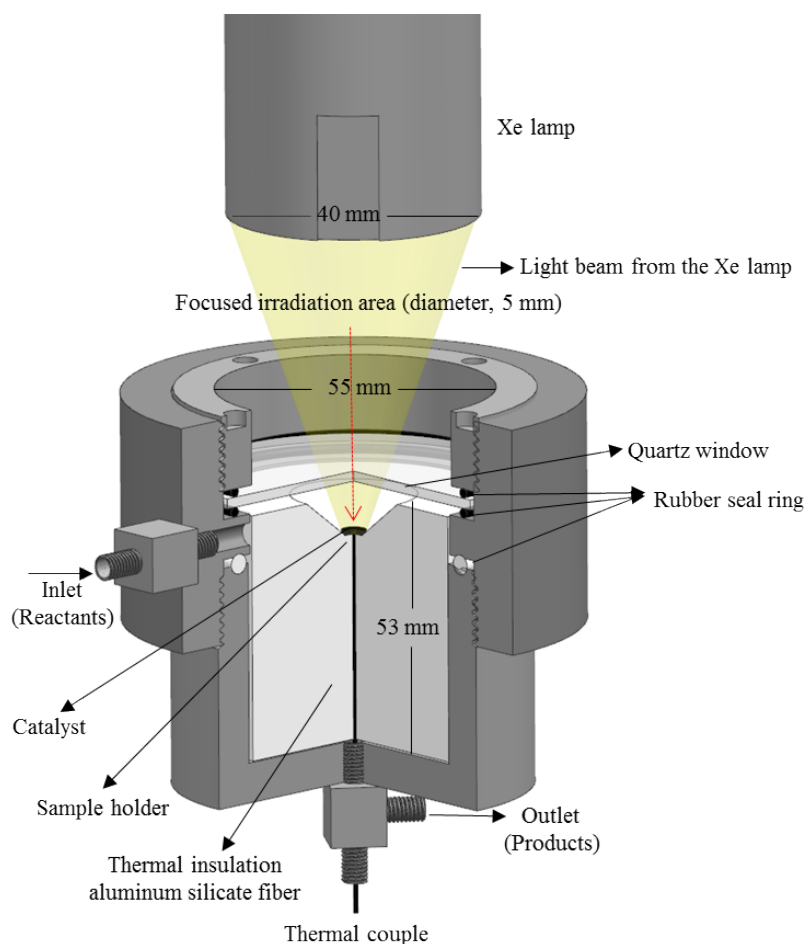
High Fuel Production Rate and Excellent Durability for Photothermocatalytic CO₂ Reduction

Achieved by Surface Plasma Effect of NiCu Alloy Nanoparticles

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Scheme S1. Schematically illustrated home-made reactor for conducting photothermocatalytic CO₂ reduction by CH₄ on the samples under the focused irradiation from a 500 W Xe lamp without using additional electric heater.

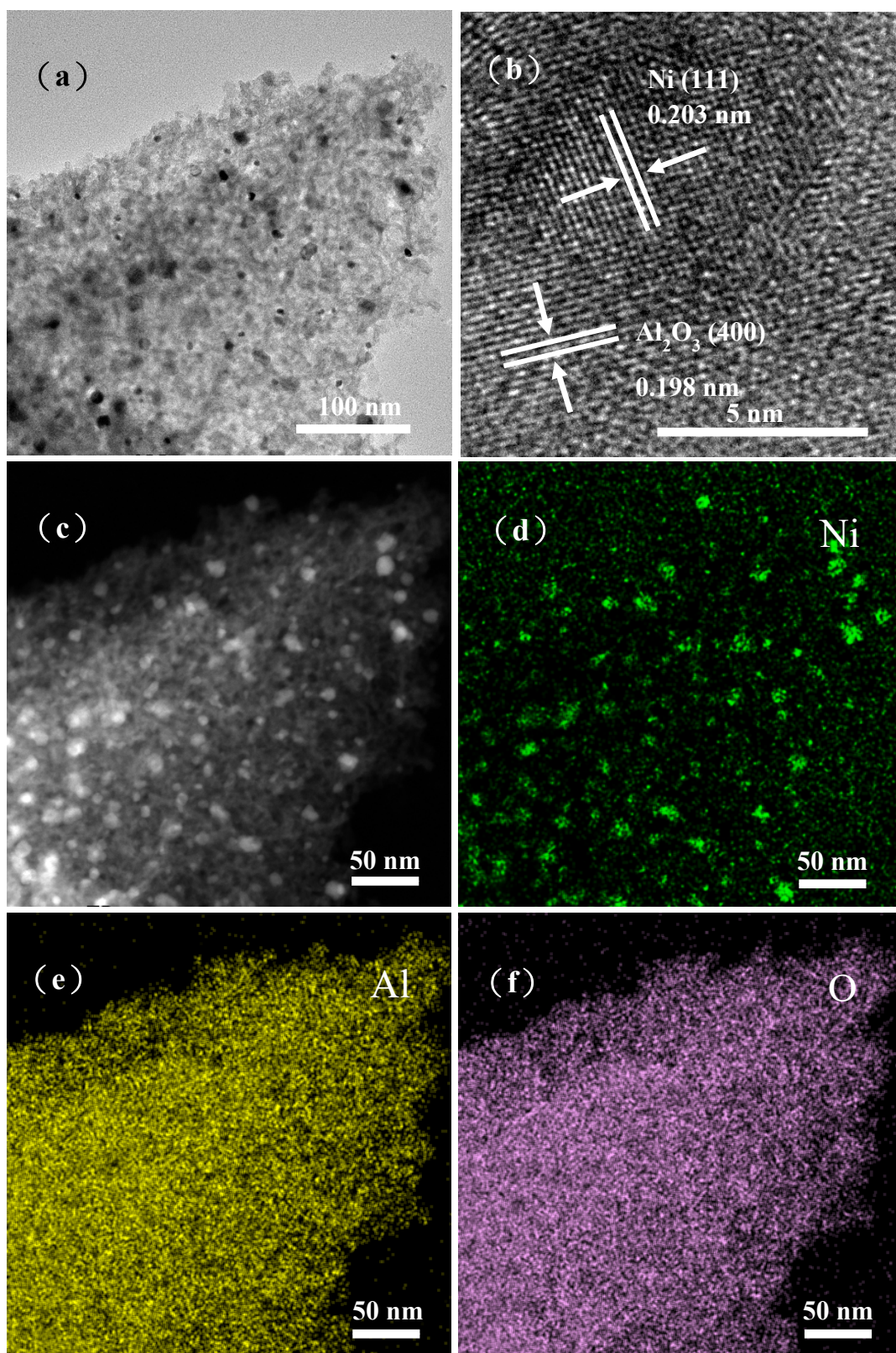


Fig. S1. Transmission electron microscopy (TEM) image (a) and high-resolution TEM image of Ni/Al₂O₃ (b). HAADF image (c) and the element mappings of Ni (d), Al (e), and O (f) of

Ni/Al₂O₃.

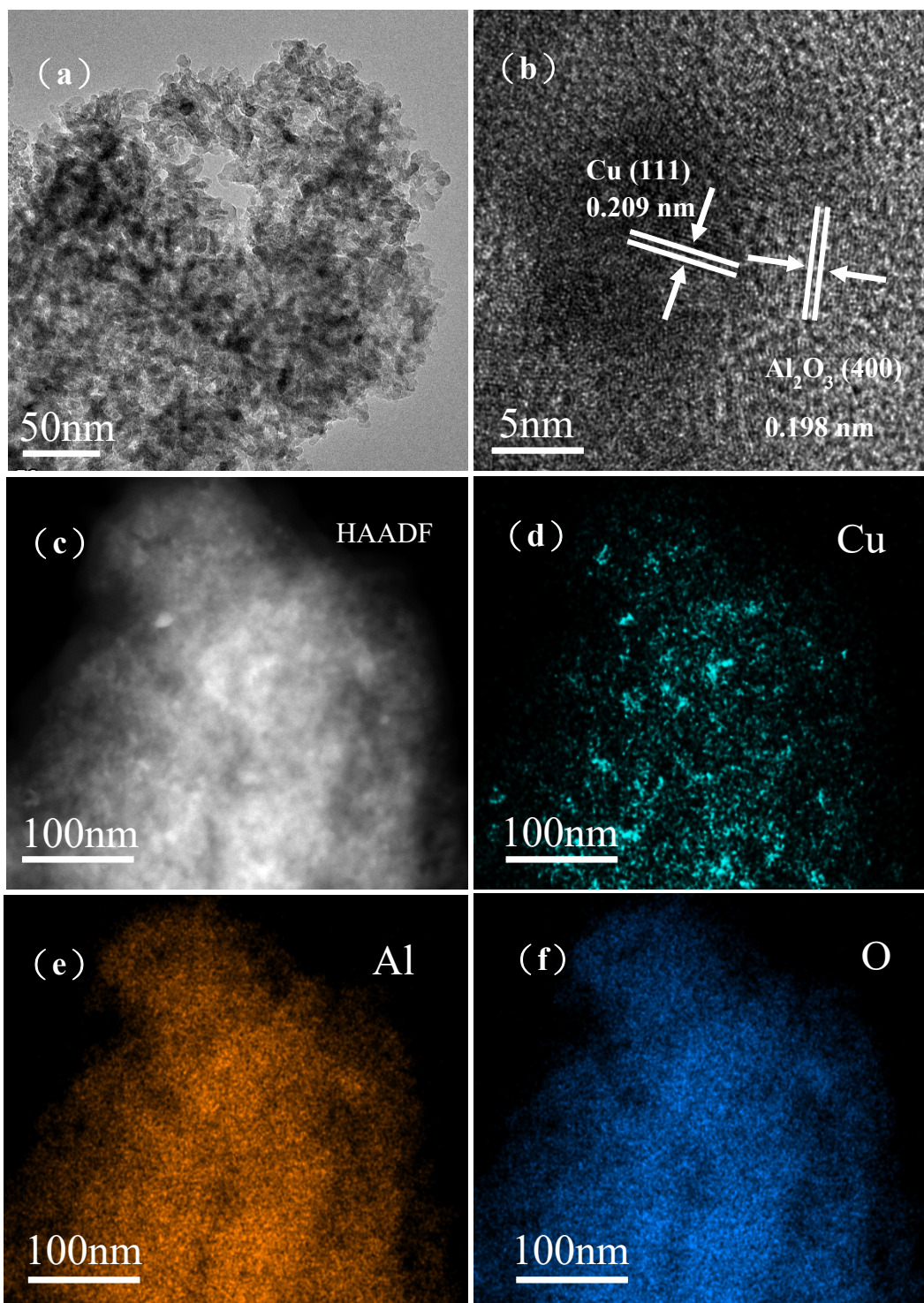


Fig. S2. Transmission electron microscopy (TEM) image (a) and high-resolution TEM image of Cu/Al₂O₃ (b). HAADF image (c) and the element mappings of Cu (d), Al (e), and O (f) of

Cu/Al₂O₃.

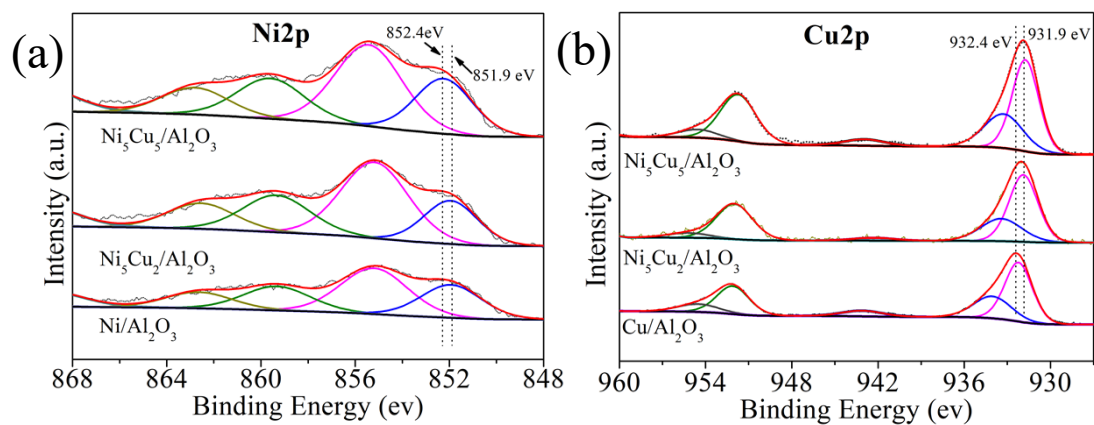


Fig. S3. XPS spectra of Ni 2p_{3/2} (a) and Cu 2p_{3/2} (b) in Ni₅Cu₅/Al₂O₃, Ni₅Cu₂/Al₂O₃, Ni/Al₂O₃ and Cu/Al₂O₃.

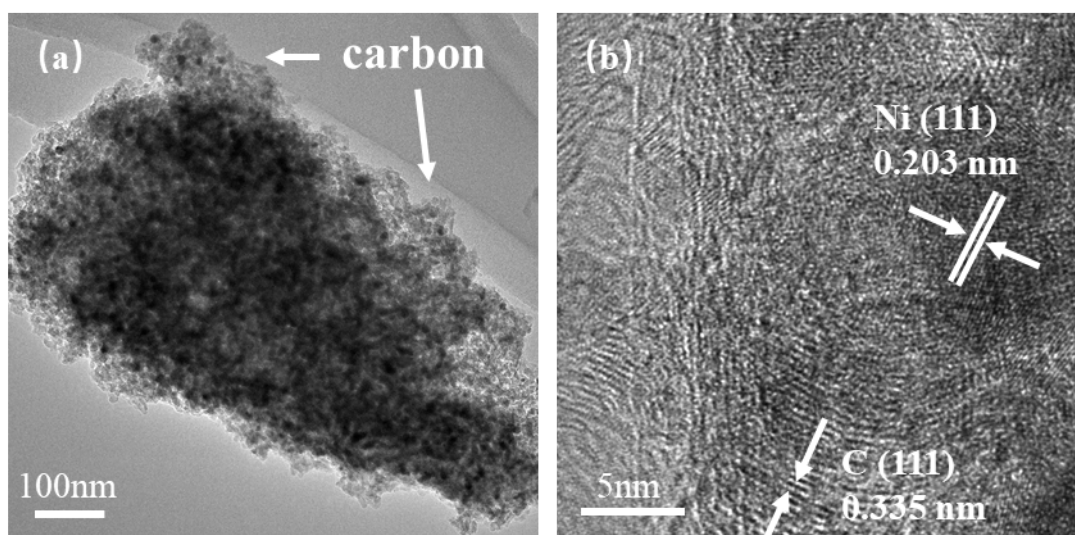


Fig. S4. TEM image (a) and HRTEM image (b) of the used Ni/Al₂O₃ sample after 50 h photothermocatalytic durability test.

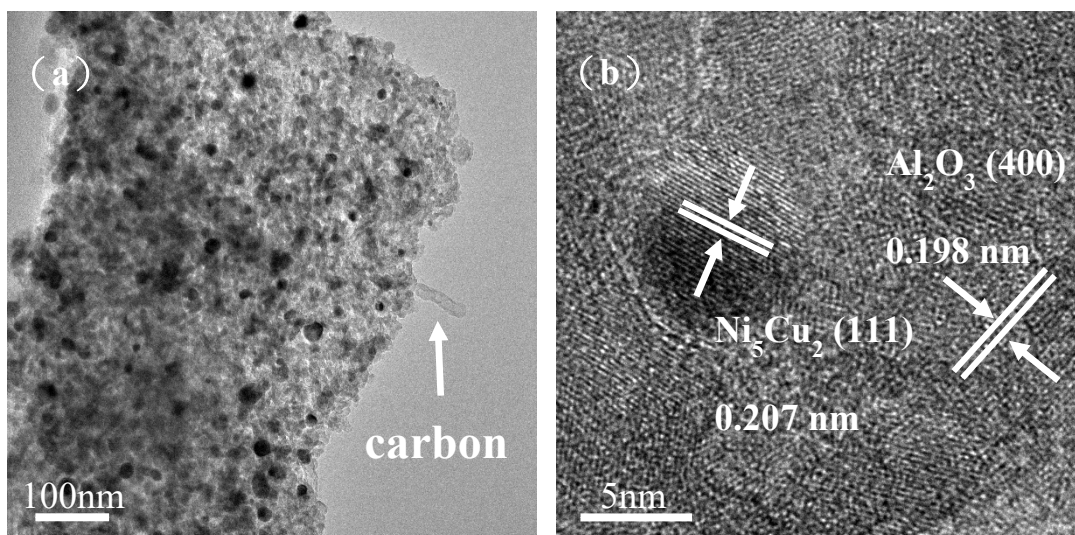


Fig. S5. TEM image (a) and HRTEM image (b) of the used $\text{Ni}_5\text{Cu}_2/\text{Al}_2\text{O}_3$ sample after 50 h photothermocatalytic durability test.

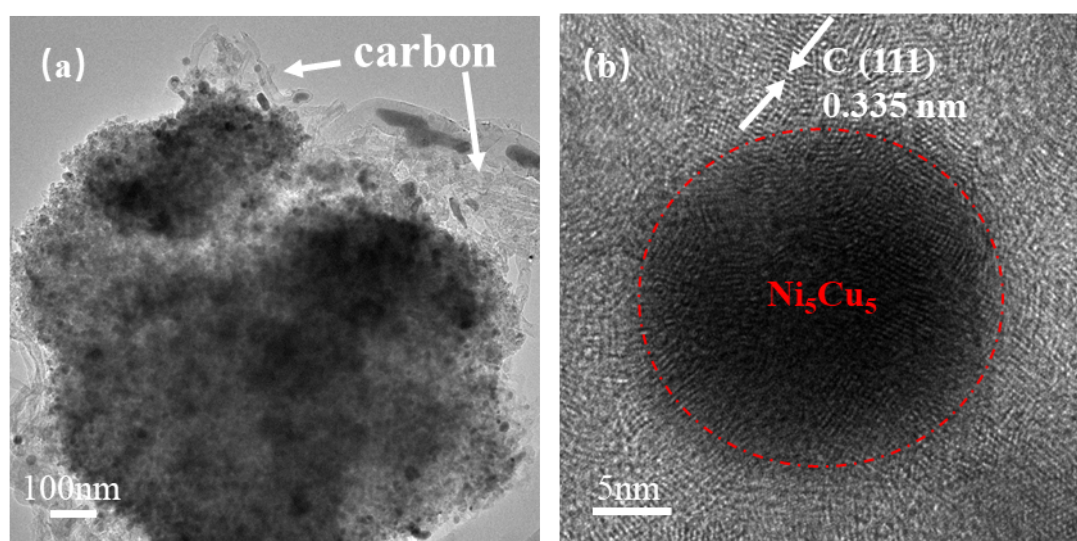


Fig. S6. TEM image (a) and HRTEM image (b) of the used $\text{Ni}_5\text{Cu}_5/\text{Al}_2\text{O}_3$ sample after 50 h photothermocatalytic durability test.