

High-yield Synthesis and Hybridizations of Cu Microplates for Catalytic Applications

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Supporting Tables.

Table S1. Values of the activity parameter, κ , for various heterogeneous catalysts; the values of κ were obtained by dividing the reaction rate constant by the total weight of used catalyst.

Catalyst	Initial concentration of 4-NP [mM]	Total weight of used catalyst [mg]	Reaction rate constant (k) [10^{-3} s^{-1}]	κ [$\text{s}^{-1} \text{ g}^{-1}$]	ref.
Cu nanoparticles	0.12	13	1.54	0.12	1
Hierarchical Cu microspheroids	3	4	3.99	1	2
Pt@Au core-shell nanoparticles	0.1	0.5	5.92	11.8	3
CuO nanoparticles	0.125	12	15.97	14.6	4
PtPd bimetallic nanoparticle	0.09	0.08	2.31	28.9	5
CuO nanosheets	0.25	0.1	4.58	45.8	6
Cu cubes	0.1	0.096	5.7	60	7
Porous Cu microspheres	5	0.06	4.29	71.5	8
NiAu core-shell nanoparticle	0.12	0.06	6.4	107	9
Cu nanoplates	1	0.07	9.5	136	10
Cu–Au hybrid microplates	1	0.07	11.6	166	This work

Supporting Figures.

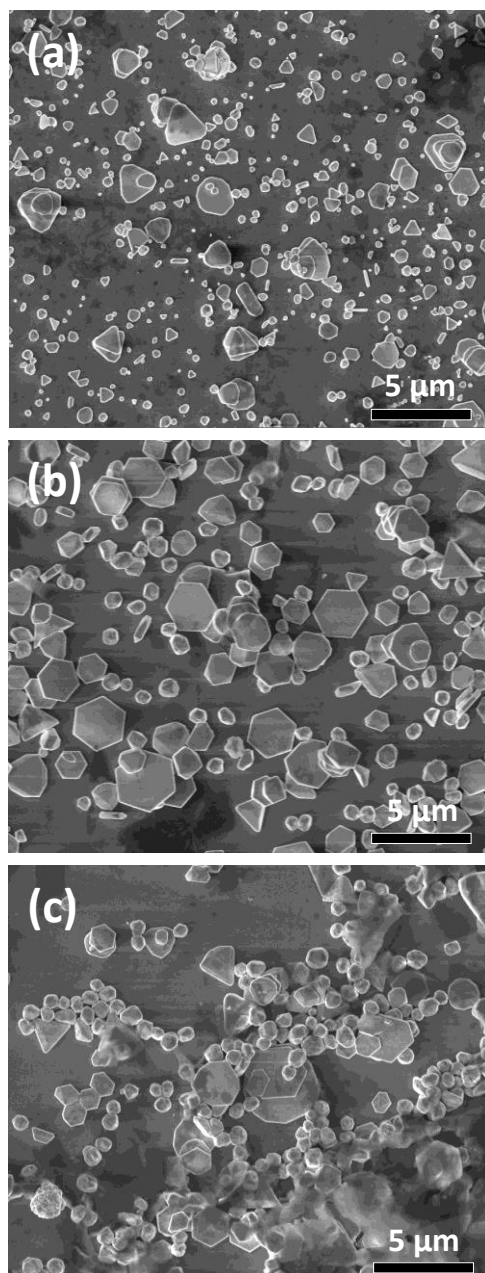


Fig. S1. SEM images of Cu nanocrystals grown in the presence of KI with different concentrations:
(a) 0.8 μM , (b) 1.6 μM , and (c) 2.4 μM .

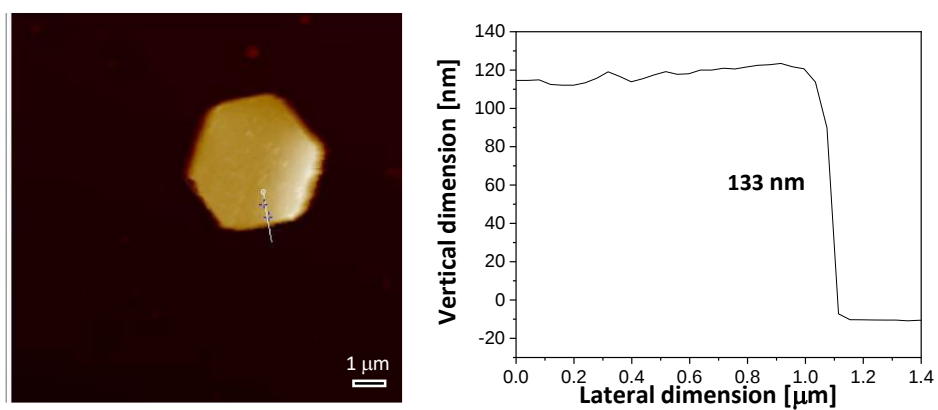


Fig. S2. AFM image and corresponding height profile of the Cu microplate shown in Fig. 2(b).

The thickness value of the Cu microplate was measured to be approximately 133 nm.

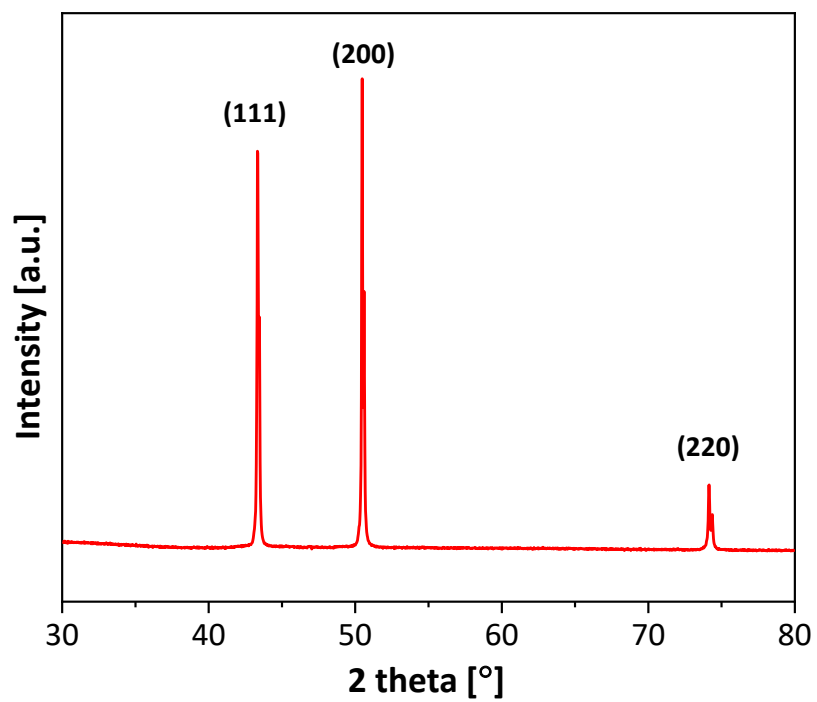


Fig. S3. XRD pattern of Cu nanocrystals shown in Fig. 2(a).

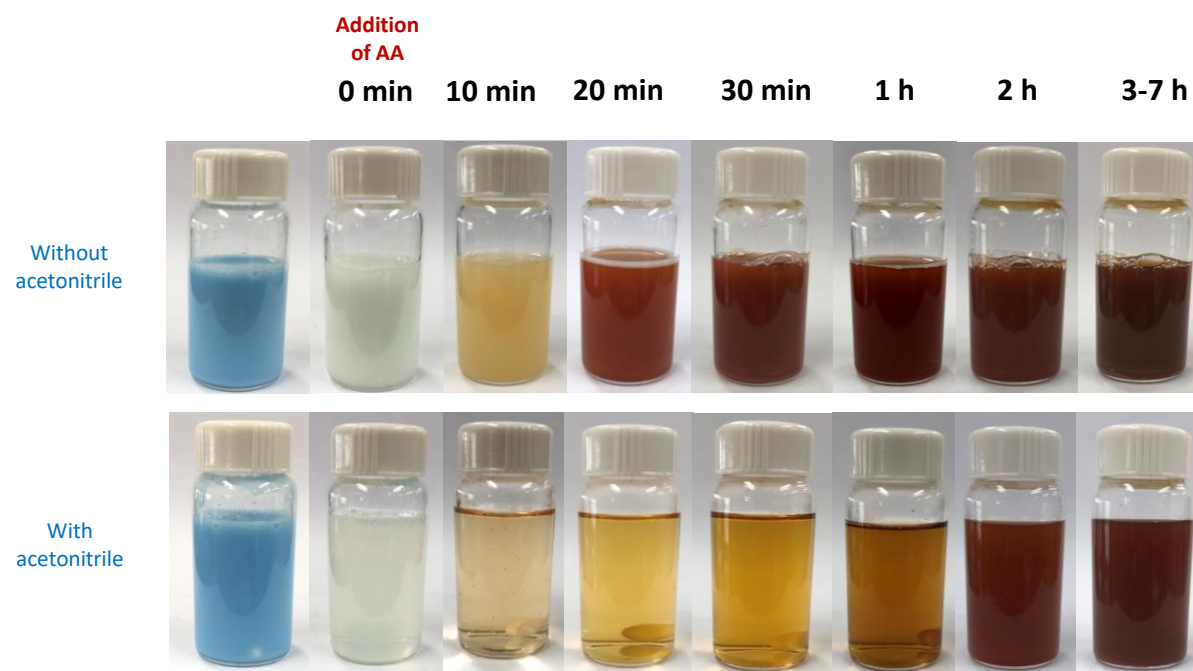


Fig. S4. Photographs showing the color changes of the reaction mixtures in the absence and presence of acetonitrile over the course of 7 h.

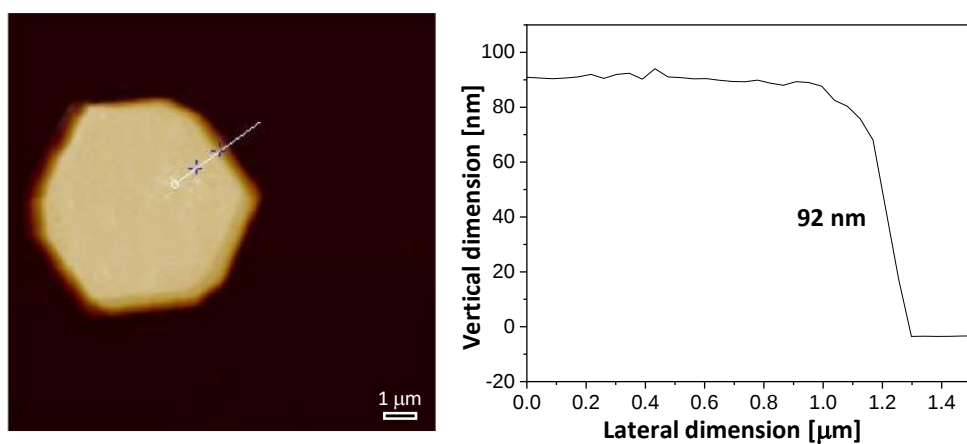


Fig. S5. AFM image and corresponding height profile of the Cu microplate shown in Fig. 3(a).

The thickness value of the Cu microplate was measured to be approximately 92 nm.

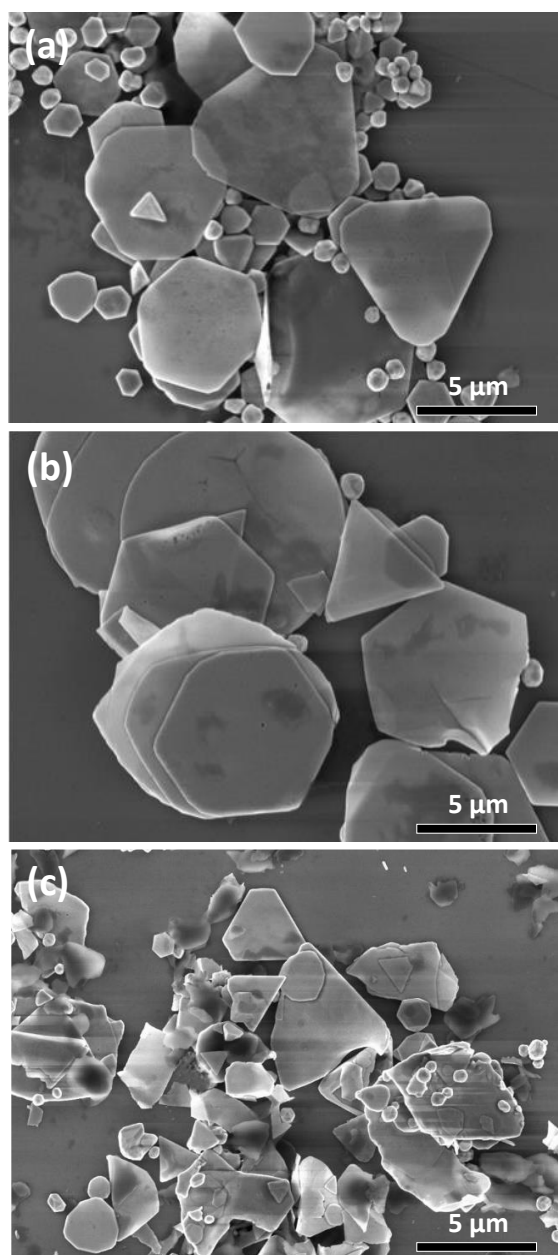


Fig. S6. SEM images of Cu nanocrystals formed in the presence of acetonitrile. The used volume ratios of acetonitrile to DI water were (a) 0.4, (b) 0.7, and (c) 1.4, respectively.

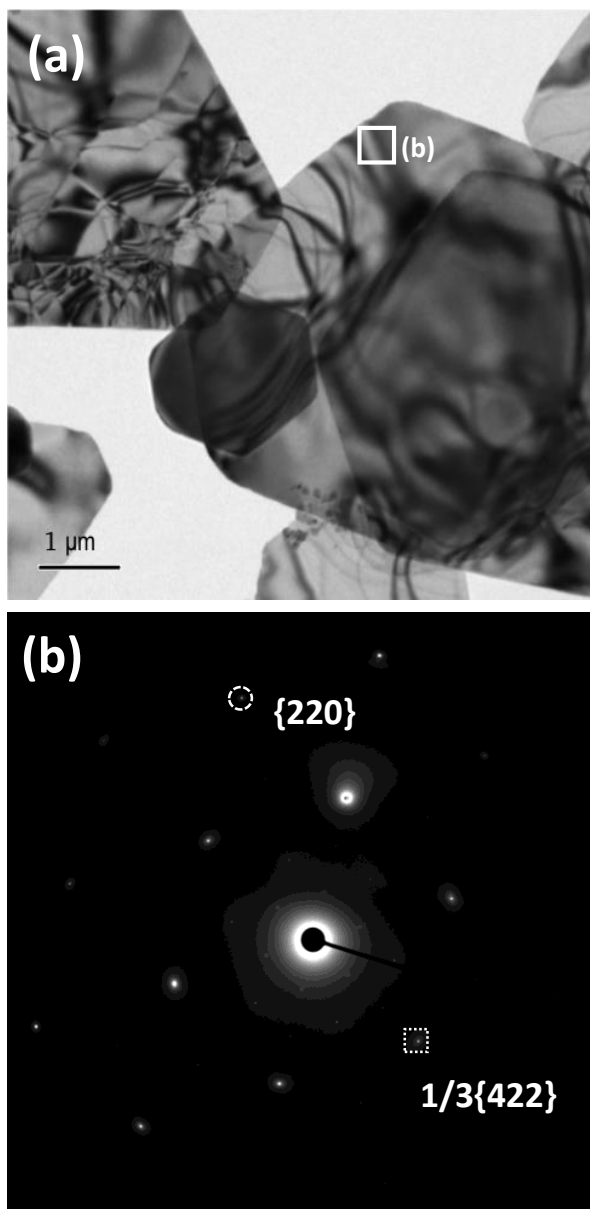


Fig. S7. (a) TEM image of Cu microplates grown in the presence of acetonitrile and (b) the corresponding selected area electron diffraction pattern.

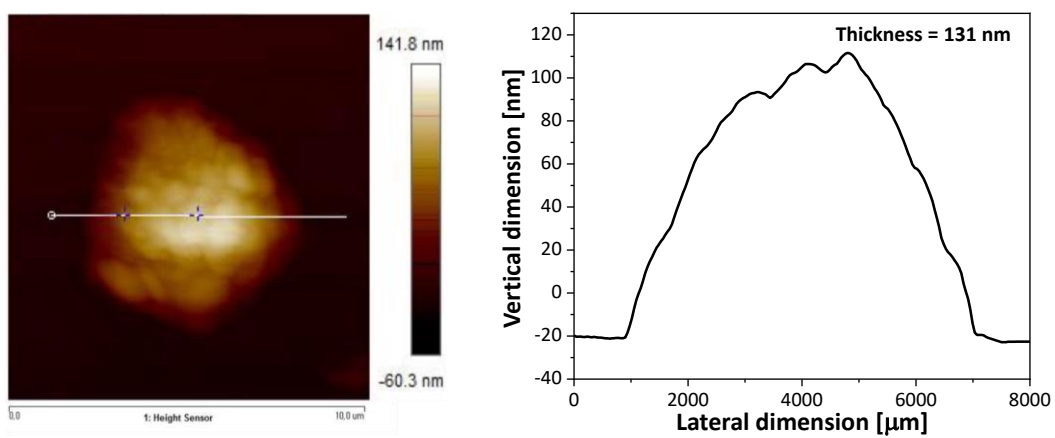


Fig. S8. AFM image and corresponding height profile of the Cu@Cu₂S hybrid microplates shown in Fig. 4. The thickness value of the hybrid microplate was measured to be approximately 131 nm.

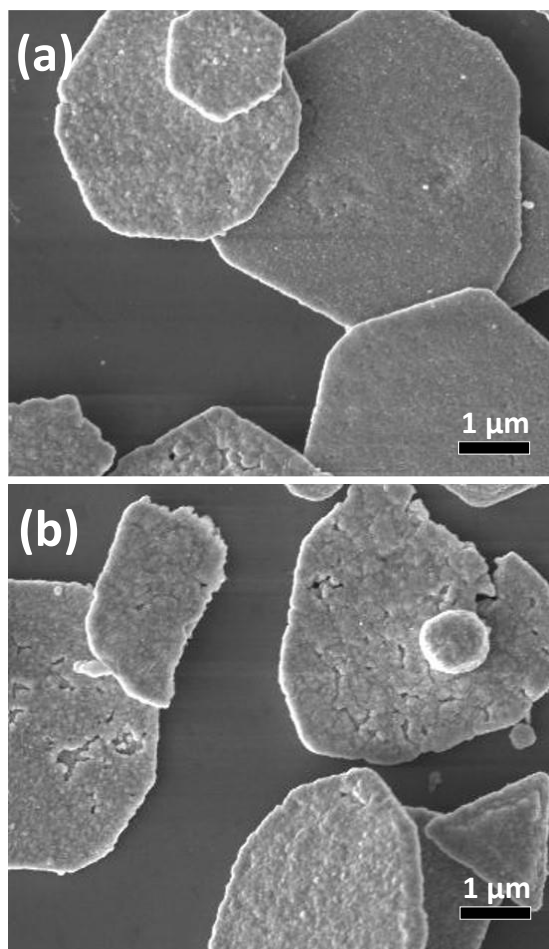


Fig. S9. SEM images Cu–Cu₂S hybrid microplates obtained after the sulfidation reaction with (a) 0.15 mM and (b) 0.6 mM Na₂S.

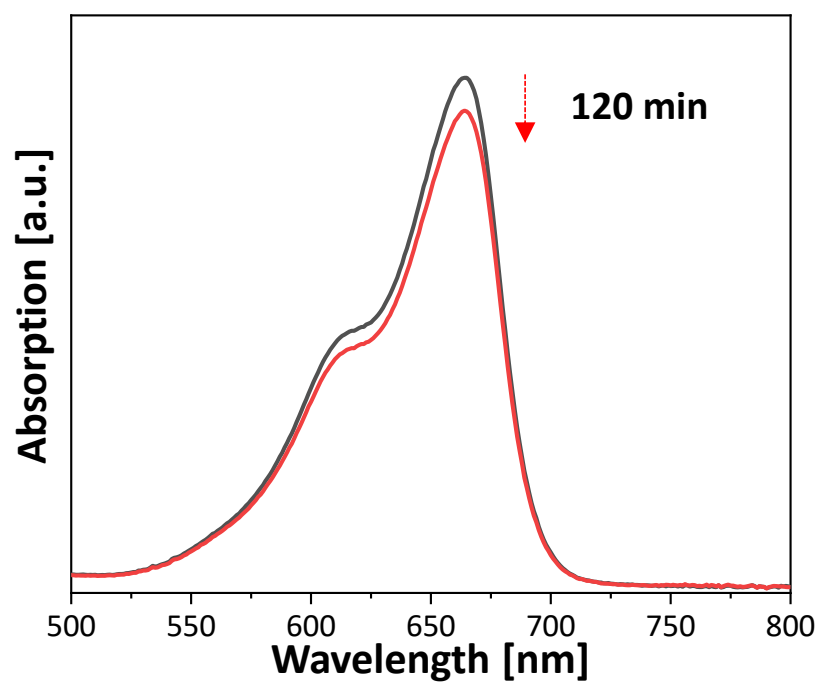


Fig. S10. UV-Vis-NIR absorption spectra showing the photodegradation behavior of MB in the presence of Cu microplates under the sunlight irradiation for 120 min.

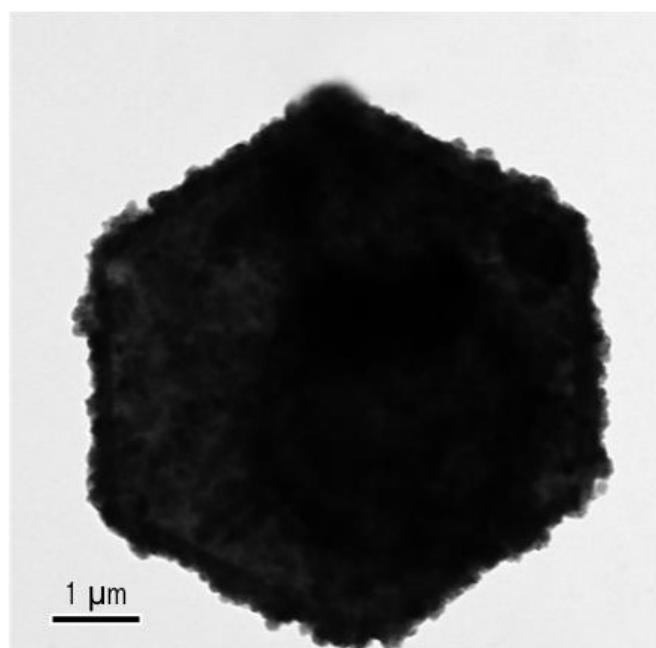


Fig. S11. TEM image of the Cu-Cu₂S hybrid microplate after three cycles for the photodegradation of MB.

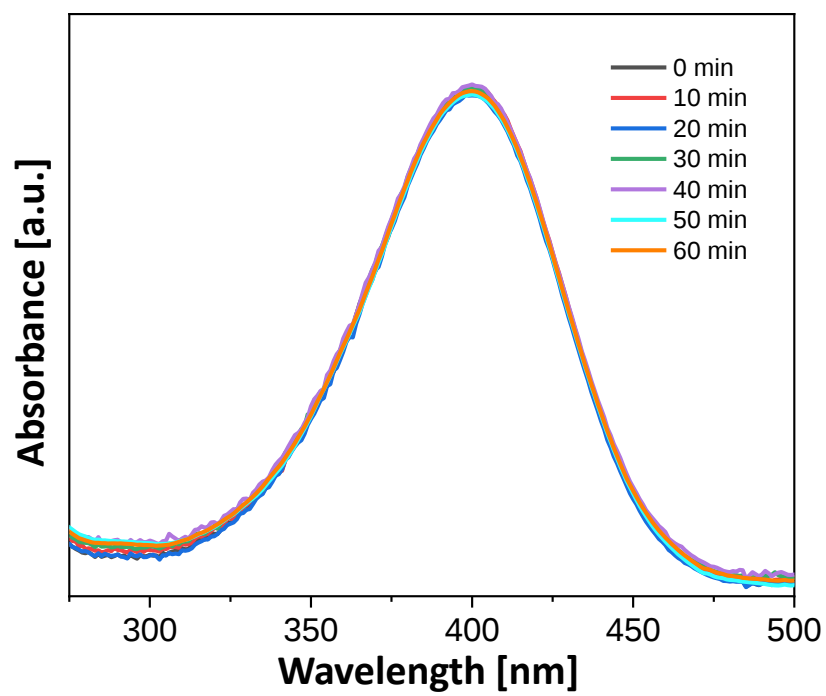


Fig. S12. UV-Vis absorption spectra for 60 min after Cu microplates were added to the solution containing 4-NP and NaBH_4 .

References

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