Supplementary data

Low-cost chrysotile-supported Cu-Ce bimetallic catalyst for efficient peroxymonosulfate activation: Singlet oxygen-driven dye degradation

Figure S1

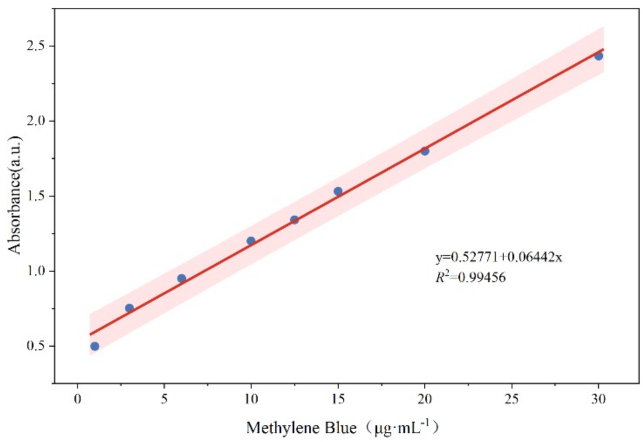

Figure S1. Calibration curve of MB solution at 25℃.

Figure S2

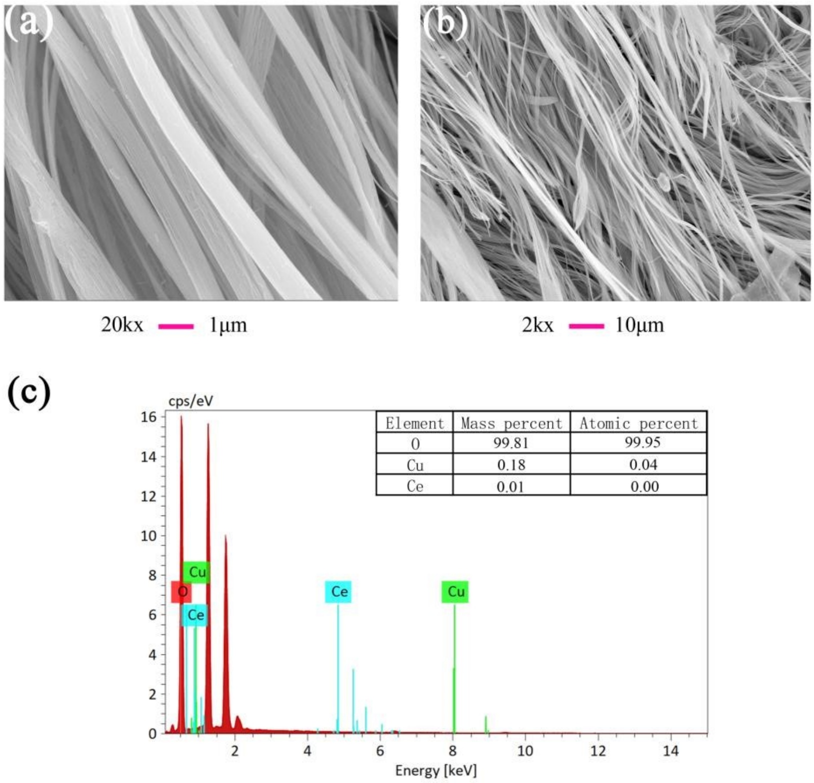

Figure S2. Characterization of unmodified Ser: (a-b) Representative SEM images, (c) EDS spectrum

Figure S3

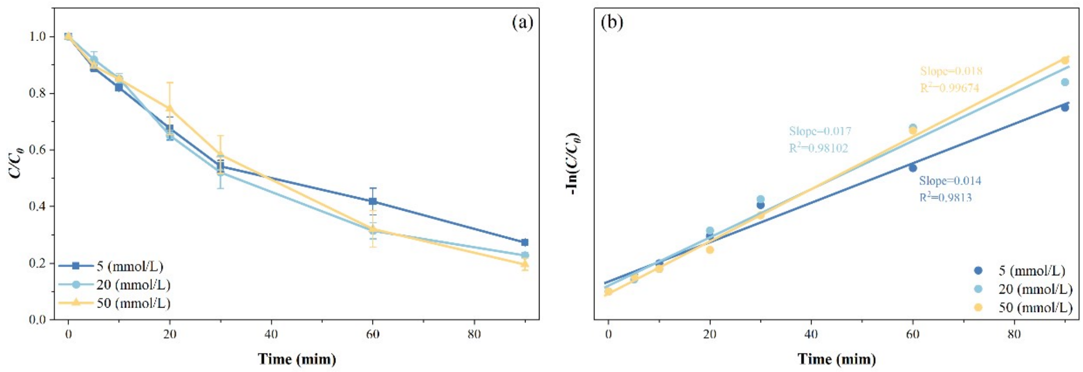

Figure S3. Effect of metal doping concentration on MB removal. (a) Degradation efficiency, (b) Pseudo-first-order kinetic fitting.

Figure S4

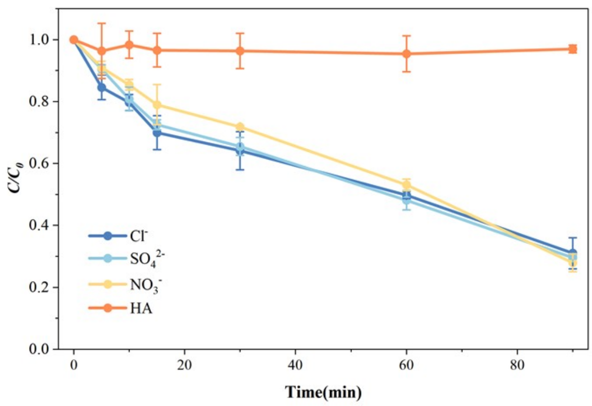

Figure S4. Removal of MB in the presence of 5 mmol/L coexisting ions.

Figure S5

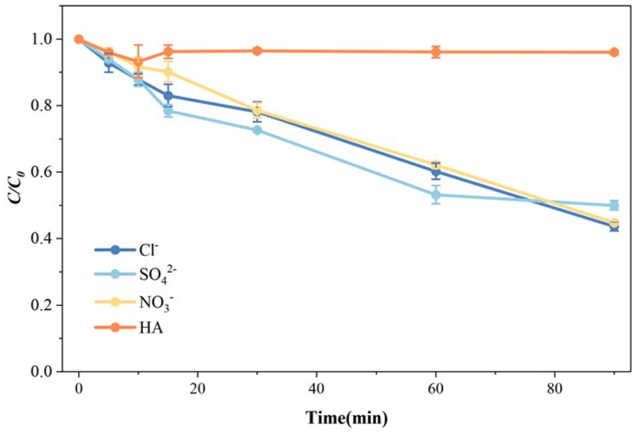

Figure S5. Removal of MB in the presence of 20 mmol/L coexisting ions.

Figure S6

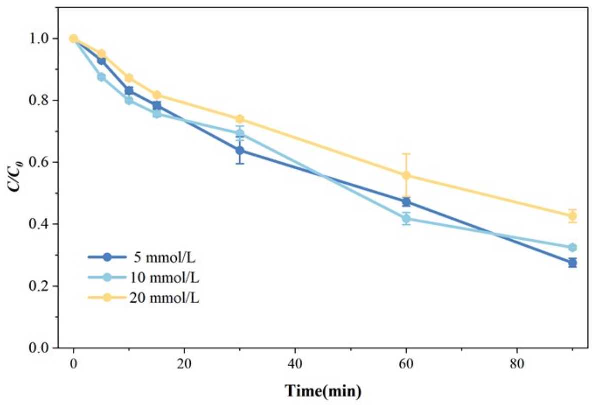

Figure S6. MB removal in the presence of various coexisting ions.

Figure S7

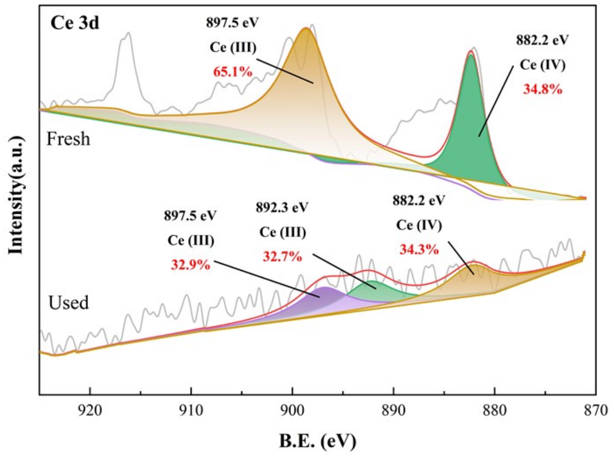

Figure S7. Ce 3d XPS spectra of Ser-CuCe-700 catalyst.

Figure S8

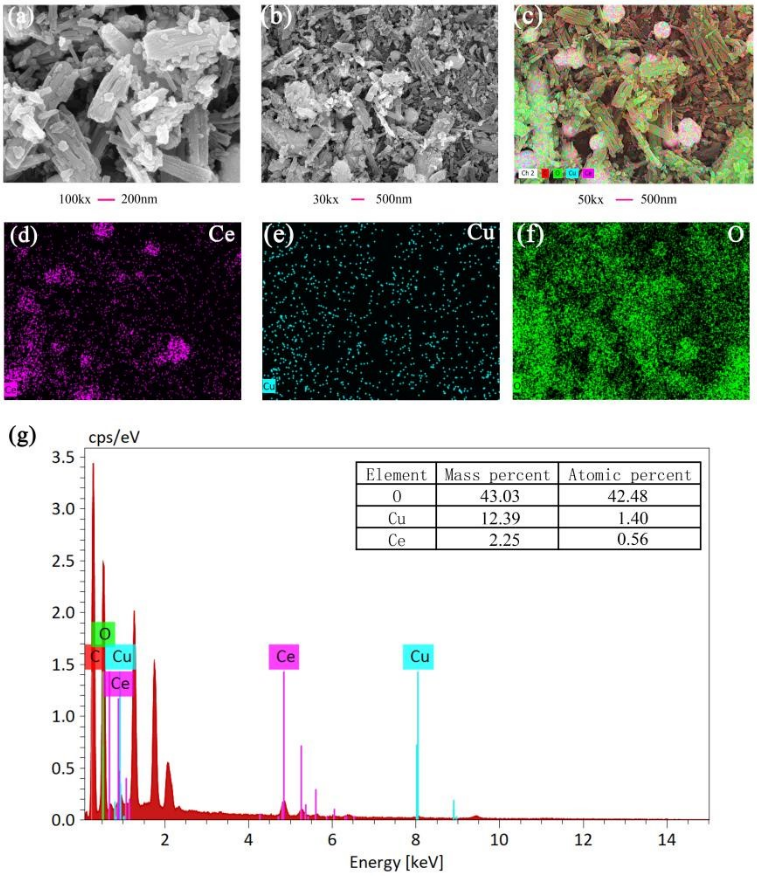

Figure S8. SEM and EDS of used ser-cuce-700.

Figure S9

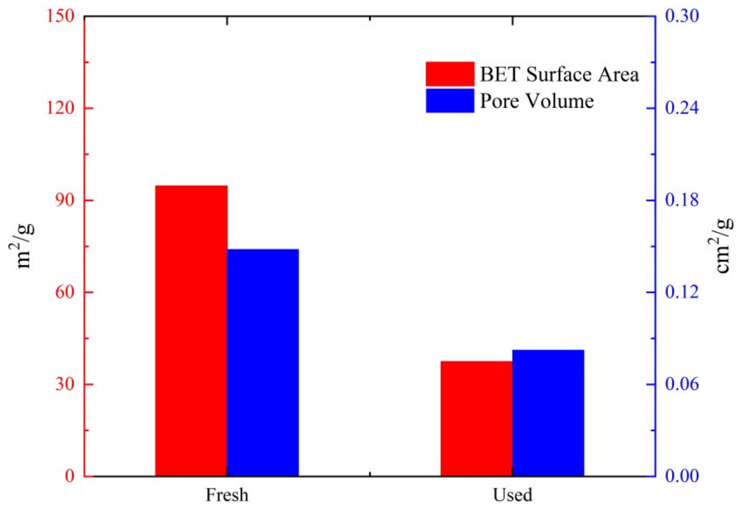

Figure S9. The BET test results of Ser-CuCe-700.

Figure S10

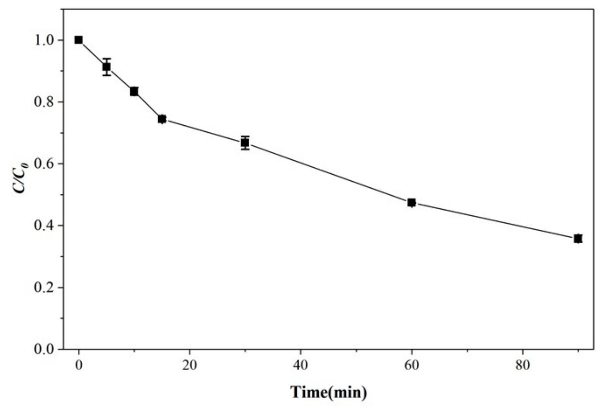

Figure S10. Degradation of MB by sre-700/PMS system in real water.

Figure S11

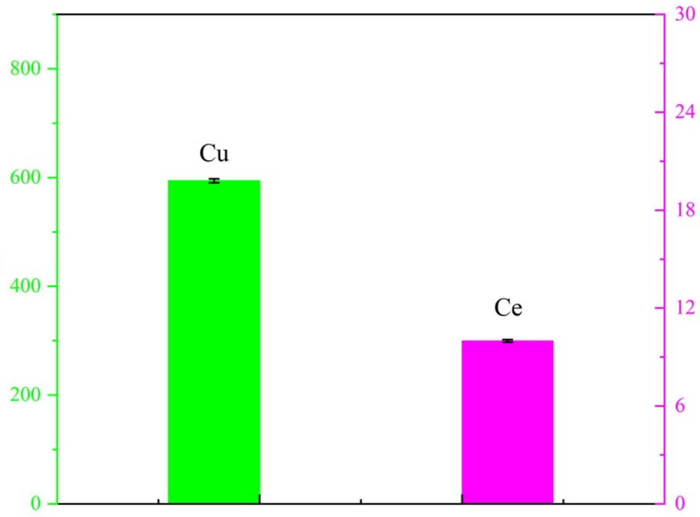

Figure S11. Concentration of Cu and Ce in ICP-MS test solution.

Table S1

Table S1. Summary of other scholars, researches about TC removal.

Catalyst	Concentration	Time(min)	Removal rate(%)	Rate of removal($mg\cdot min^{-1}$)	Source
Ser–CuCe–700	20 mg/L	90	87.70	0.00974	**This work**
Pristine CeO_2	4.6 uM	175	100	0.00571	[1]
CeO_2	5 mg/L	75	85	0.01133	[2]
Bi_2O_3–Al_2O_3	20 mg/L	80	70	0.00875	[3]
SiO_2/TiO_2	10 mg/L	300	75.81	0.00252	[4]
BiOBr	5 mg/L	60	About 51	0.00850	[5]
CuO_0	10 mg/L	60	90	0.01500	[6]
Co_3O_4	10 mg/L	40	84.06	0.02101	[7]

[1] Majumder D, Chakraborty I, Mandal K, et al. Facet-dependent photodegradation of methylene blue using pristine CeO_2 nanostructures[J]. ACS omega, 2019, 4(2): 4243-4251.

[2] Vatanparast M, Saedi L. Sonochemical-assisted synthesis and characterization of CeO_2 nanoparticles and its photocatalytic properties[J]. Journal of Materials Science: Materials in Electronics, 2018, 29(9): 7107-7113.

[3] Liu C B, Qian J C, Chen F, et al. Facile Synthesis of Highly Ordered Macroporous CeO_2 Film for Methylene Blue Degradation[C]. Materials Science Forum, 2014, 787: 41-45.

[4] Babyszko A, Wanag A, Sad owski M, et al. Synthesis and characterization of SiO_2/TiO_2 as photocatalyst on methylene blue degradation[J]. Catalysts, 2022, 12(11): 1372.

[5] Miao L, Hu J, Peng R, et al. Boosting organic pollutants degradation through synergistic photocatalysis and peroxymonosulfate activation by bismuth oxybromide[J]. New Journal of Chemistry, 2026, 50(10): 4471-4482.

[6] Zuo X, Jiang A, Zou S, et al. Copper oxides activate peroxymonosulfate for degradation of methylene blue via radical and nonradical pathways: surface structure and mechanism[J]. Environmental Science and Pollution Research, 2023, 30(5): 13023-13038.

[7] Zhang C, Liao X, Wang X, et al. Fabrication of a Co_3O_4 monolithic membrane catalyst as an efficient PMS activator for the removal of methylene blue[J]. New Journal of Chemistry, 2023, 47(16): 7668-7677.