Electronic Supplementary Material (ESI) for RSC Advances.

Rice husk biochar modified-$CuCo_2O_4$ as an efficient peroxymonosulfate activator for non-radical degradation of organic pollutants from aqueous environment

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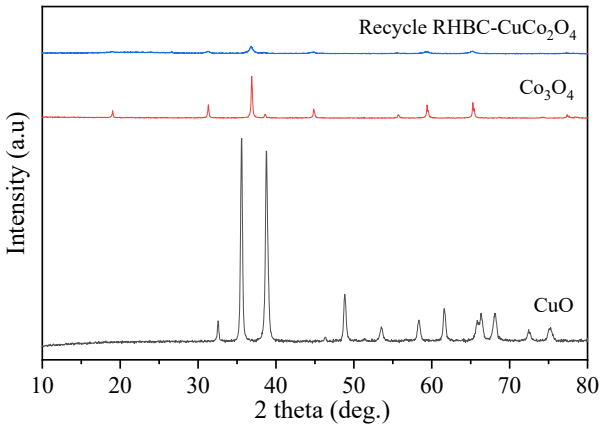

Fig. S1. XRD patterns of CuO, Co_2O_3, and recycle RHBC-$CuCo_2O_4$.

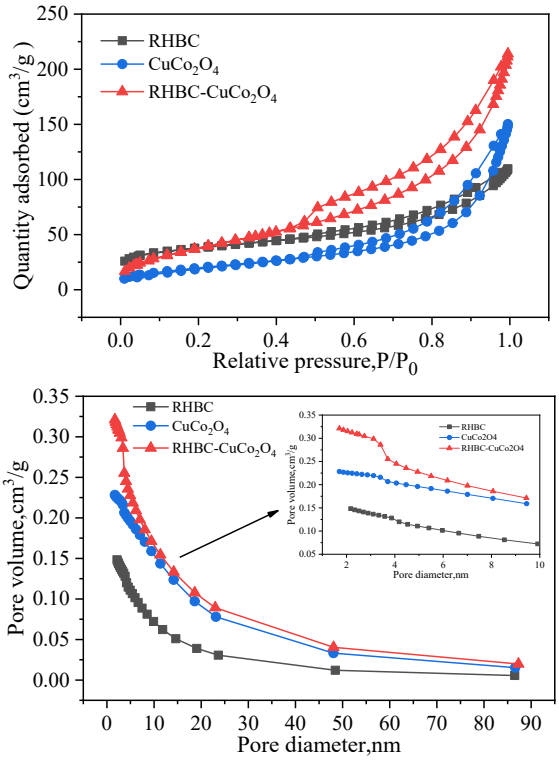

Fig. S2. N_2 sorption isotherms and pore size distributions of different materials (RHBC, $CuCo_2O_4$, RHBC-$CuCo_2O_4$).

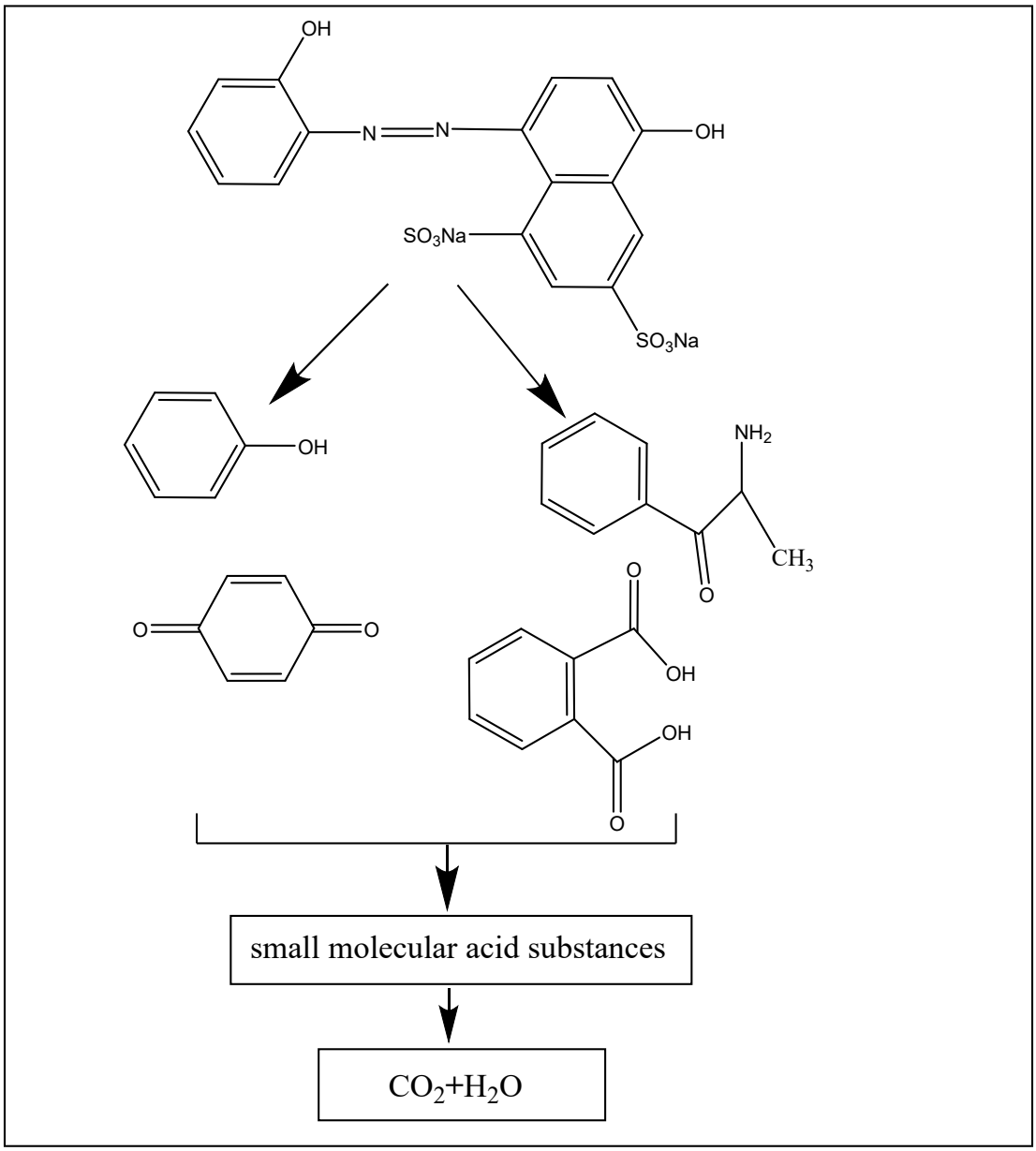

Fig S3. A possible pathway of OG oxidation degradation.

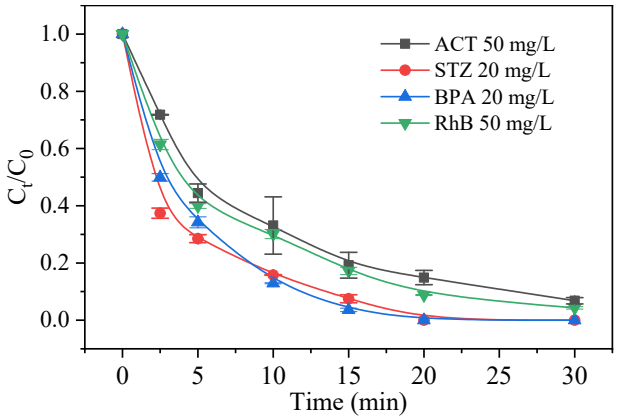

Fig S4. Biodegradation efficiency of RHBC-$CuCo_2O_4$ for different pollutant. Condition: [ACT] = 50 mg/L, [STZ] = 20 mg/L, [BPA] = 20 mg/L, [RhB] = 50 mg/L, [catalyst] = 100 mg/L, [PMS] = 307 mg/L, and T = 25 °C.

Table S1. Surface porosity of various materials.

Catalysts	SSA(m^2/g)	Pore size (nm)	Pore volume (cm^3/g)
RHBC	128.6	5.12	0.165
$CuCo_2O_4$	72.6	12.01	0.218
RHBC- $CuCo_2O_4$	142.9	8.81	0.315

Table S2. Degradation of pollutants by different catalysts.

Preparation method	Catalysts	Pollutant	Oxidants	Initial pH	Ros	Ref.
Sol-gel method	$CuCo_2O_4$@kaolin (0.1 g/L)	SIZ (10 mg/L)	PMS (1 mM)	7.0	$SO_4^{\bullet-}$, $^{\bullet}OH$, $O_2^{\bullet-}$ $^1O_2$	[1]
pyrolysis method	RHBC-$CuCo_2O_4$ (0.307 g/L)	STZ (20 mg/L)	PMS (1 mM)	3.4	$SO_4^{\bullet-}$, $^{\bullet}OH$, $O_2^{\bullet-}$ $^1O_2$	This study
hydro-thermal method	GO-$CuCo_2O_4$ (0.05 g/L)	BPA (22.83 mg/L)	PMS (0.2 mM)	7.0	$SO_4^{\bullet-}$, $^{\bullet}OH$	[2]
pyrolysis method	RHBC-$CuCo_2O_4$ (0.1 g/L)	BPA (20 mg/L)	PMS (1 mM)	3.4	$SO_4^{\bullet-}$, $^{\bullet}OH$, $O_2^{\bullet-}$ $^1O_2$	This study
solvothermal method	AC-$CuCo_2O_4$ (0.2 g/L)	3BF (25.63 mg/L)	PMS (0.4 mM)	10.0	$SO_4^{\bullet-}$, $^{\bullet}OH$, $O_2^{\bullet-}$,$^1O_2$	[3]
pyrolysis method	RHBC-$CuCo_2O_4$ (0.1 g/L)	OG (50 mg/L)	PMS (1 mM)	3.4	$SO_4^{\bullet-}$, $^{\bullet}OH$, $O_2^{\bullet-}$,$^1O_2$	This study

References

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2. X. Q. Xu, Y. B. Feng, Z. H. Chen, S. B. Wang, G. H. Wu, T. L. Huang, J. Ma, G. Wen,Sep. Purif. Technol., 2020, **251** 117351.
3. S. Chen, X. Liu, S. Y. Gao, Y.C. Chen, L.J. Rao,Z. W. Wu, *Environ. Res.*, 2020, **183**, 109245.