

Figure S1. Schematic diagram of catalyst performance test equipment.

Table S1. Catalytic oxidation of toluene of bimetallic catalysts.

Samples	Temperature of complete oxidation	Ref.
	of toluene (°C)	
PtCo ₃ -su	237	This work
10%Cr-Pt/ZSM-5	More than 255	[1]
Rh ₁ Cu ₃ /ZSM-5	More than 262	[2]
Ir/Ce(A)/Al ₂ O ₃ -H ₂	310	[3]
Cu/Ag/ZSM-5	More than 300	[4]
Cu _{0.2} Co	257	[5]

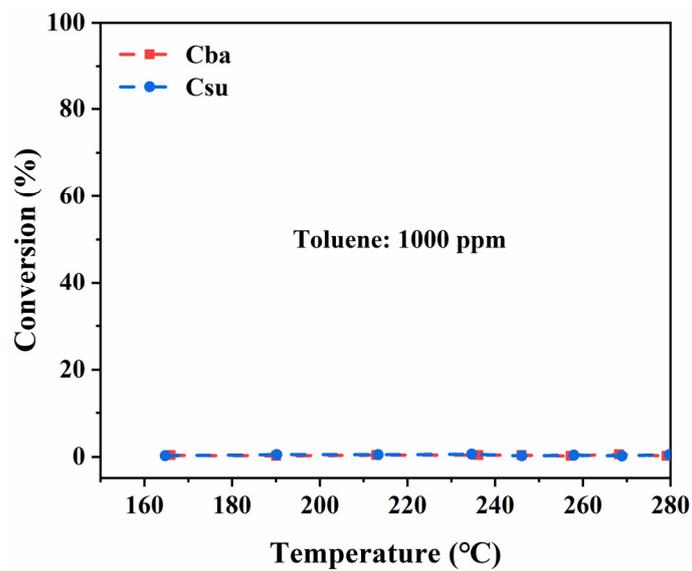


Figure S2. Performance test results of two biomass carbon supports.

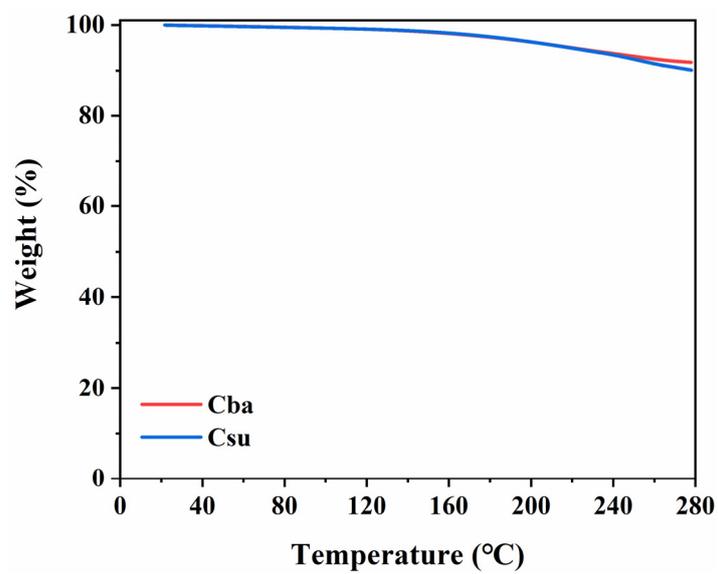


Figure S3. TGA curve of two biomass carbon supports.

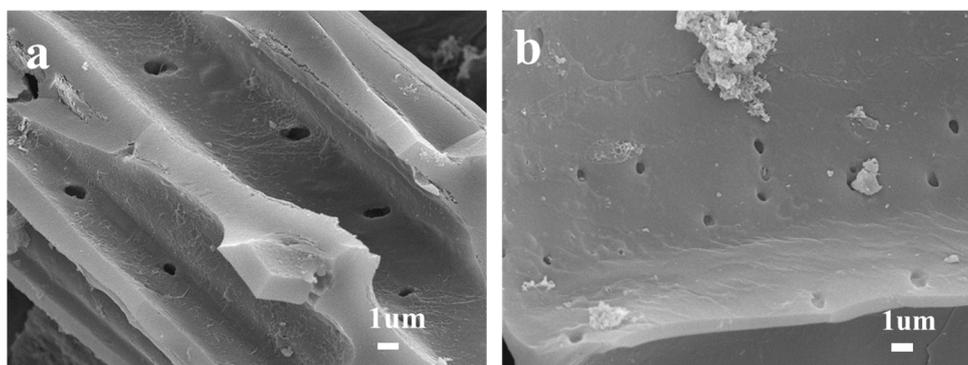


Figure S4. SEM of Cba (a), Csu (b).

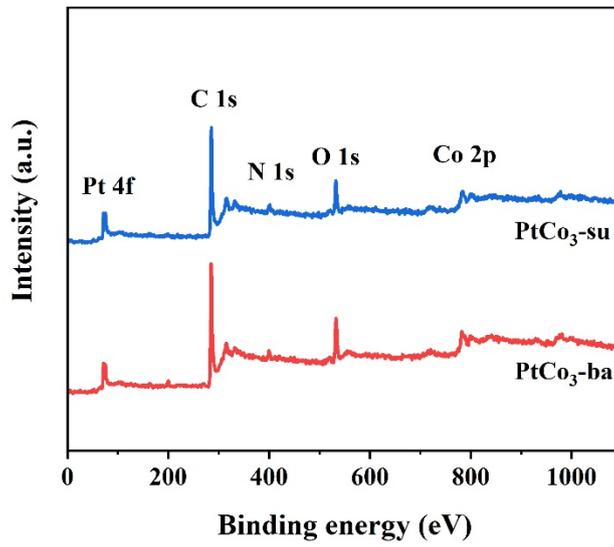


Figure S5. XPS spectrum of PtCo₃-ba and PtCo₃-su.

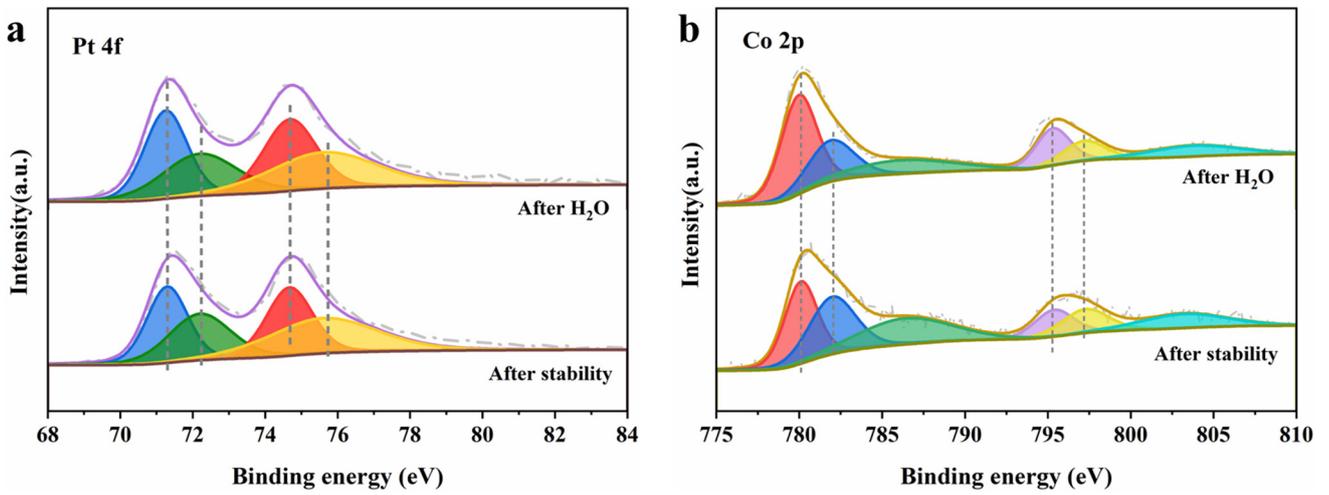


Figure S6. XPS spectrum of PtCo₃-su after H₂O and stabilization test: (a) Pt 4f and (b) Co 2p.

References

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- [3] Wang Z, Zhang L, Ji J, Wu Y, Cai Y, Yao X, et al. Catalytic enhancement of small sizes of CeO₂ additives on Ir/Al₂O₃ for toluene oxidation. *Appl Surf Sci* 2022;571. <https://doi.org/10.1016/j.apsusc.2021.151200>.
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