Support Information

Bimental composites for photocatalytic reduction of CO2 to CO in the near-infrared region by SPR effect

Hua Jianga, Shuaiqi Gonga, Shu Xua, Penghui Shia, Jinchen Fana*, Volkan Cecenc

, QunJie Xua,b*, YuLin Mina,b*

aShanghai Key Laboratory of Materials Protection and Advanced Materials

in Electric Power, Shanghai University of Electric Power, Shanghai200090, P.R. China

bShanghai Institute of Pollution Control and Ecological Security,

Shanghai200092, P.R. China

cDepartment of Chemical Engineering and Biointerfaces Institute,

University of Michigan, Ann Arbor, MI, 48109, United States

E-mail:jinchen.fan@shiep.edu.cn; minyulin@shiep.edu.cn; xuqunjie@shiep.edu.cn;

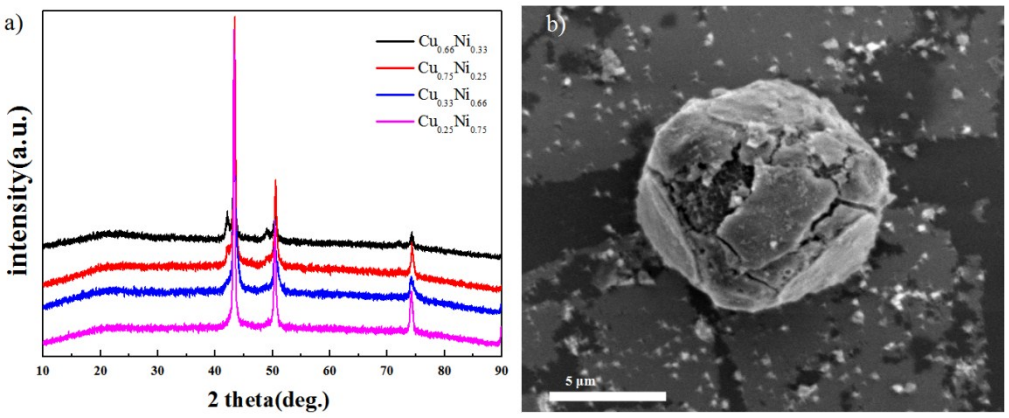


Figure S1. XRD of different proportions of CuNi/C-550(a). SEM CuNi/C-300(b).

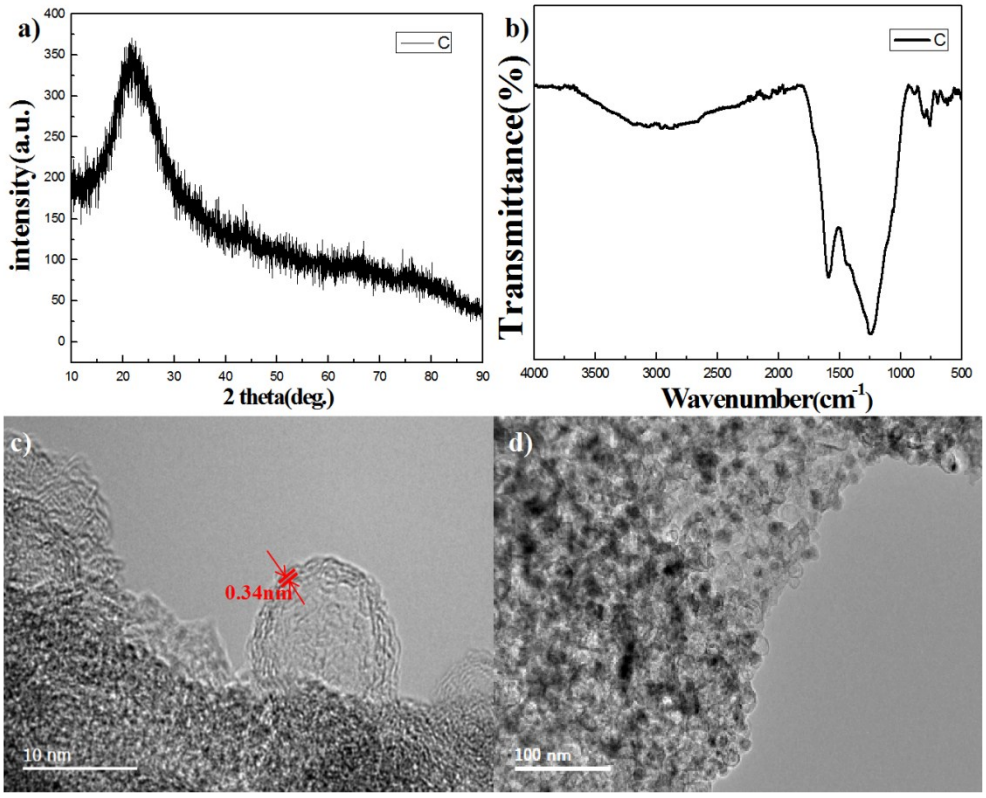


Figure S2. XRD of C(a). FTIR patterns of C(b).TEM of C(c,d).

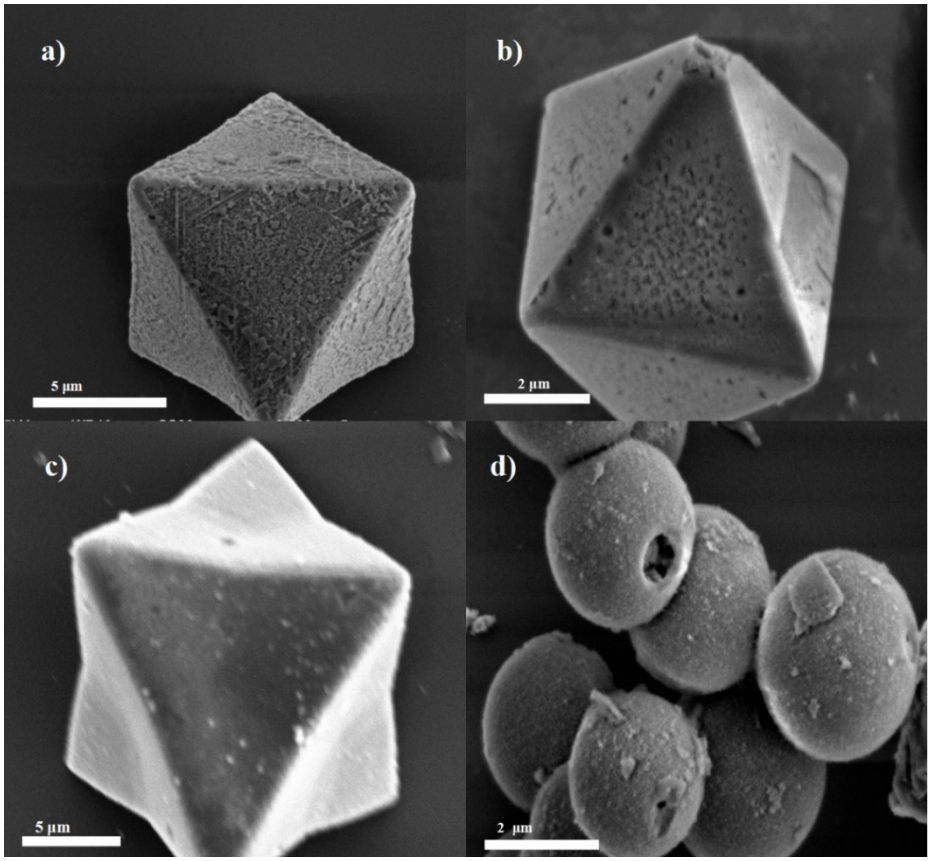


Figure S3.SEM of $Cu_{0.66}Ni_{0.33}$BTC(a), $Cu_{0.75}Ni_{0.25}$BTC(b), $Cu_{0.33}Ni_{0.66}$BTC(c), $Cu_{0.25}Ni_{0.75}$BTC(d)

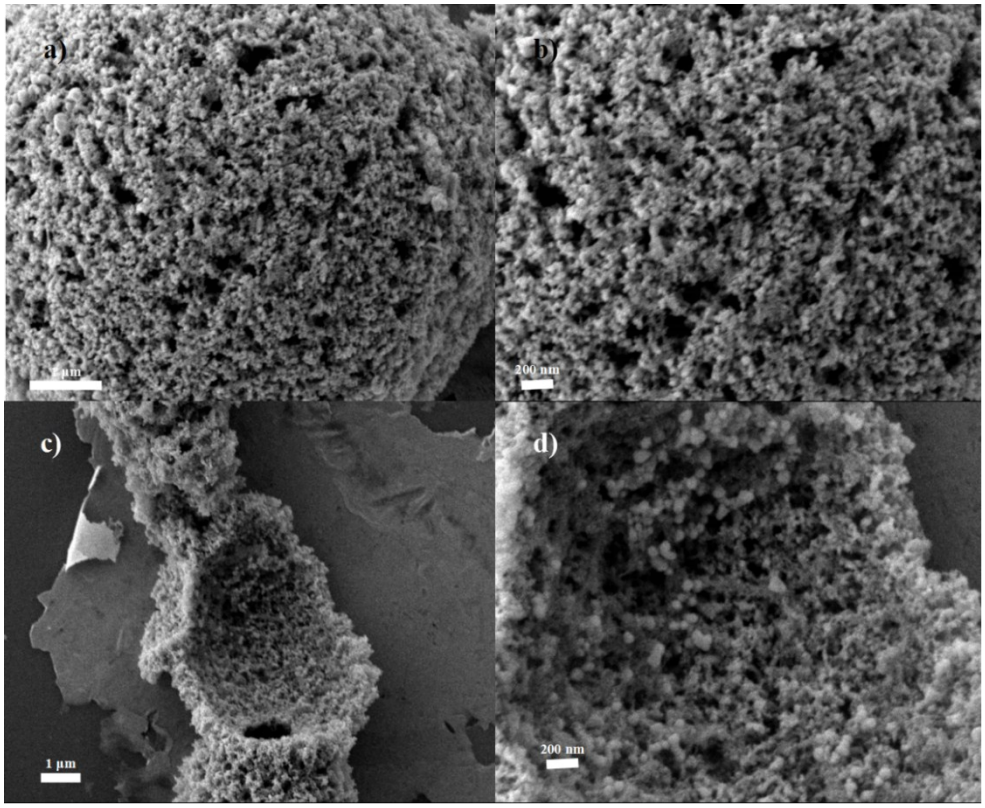


Figure S4 .SEM of CuNi/C-450

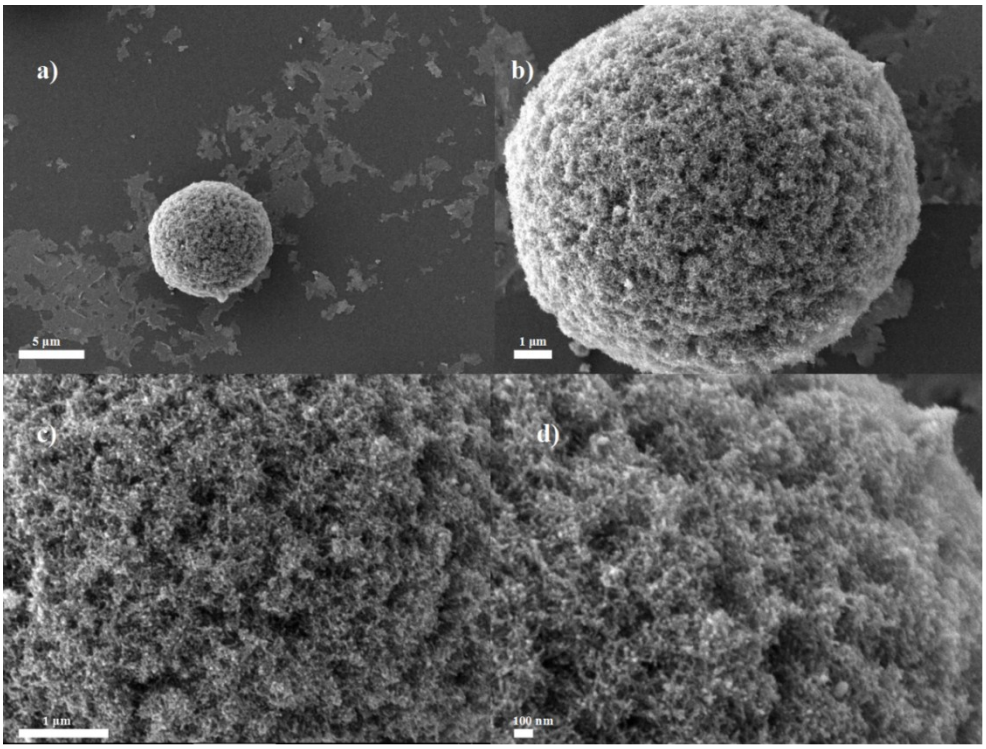


Figure S5. .SEM of CuNi/C-550

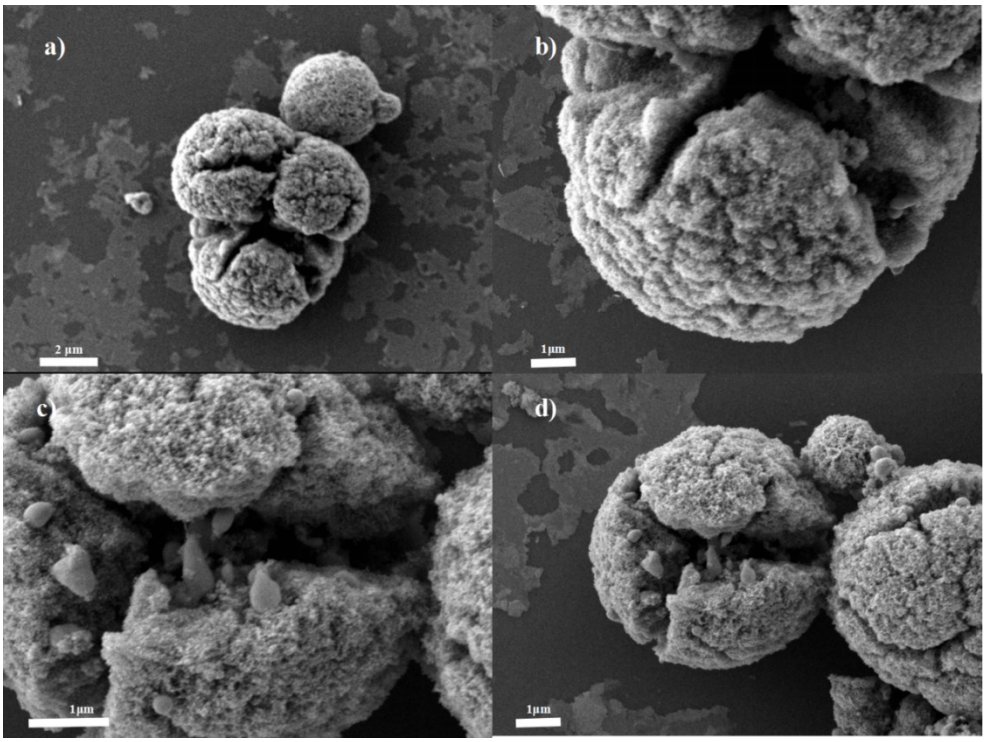


Figure S6.SEM of CuNi/C-550

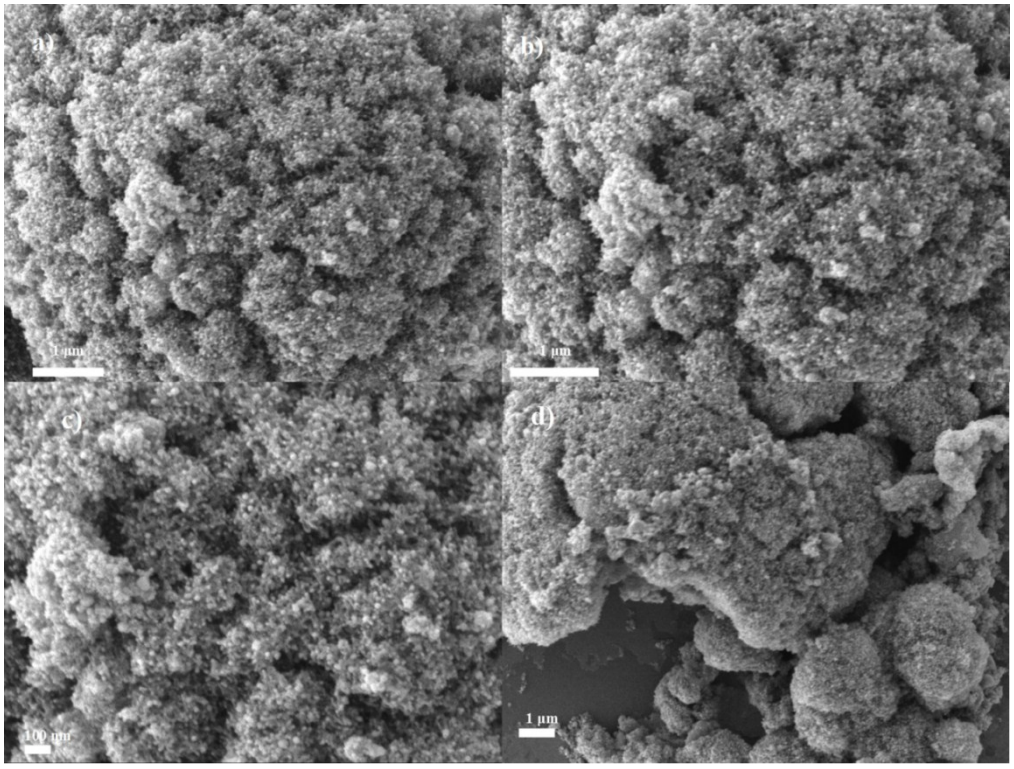


Figure S7.SEM of CuNi/C-650

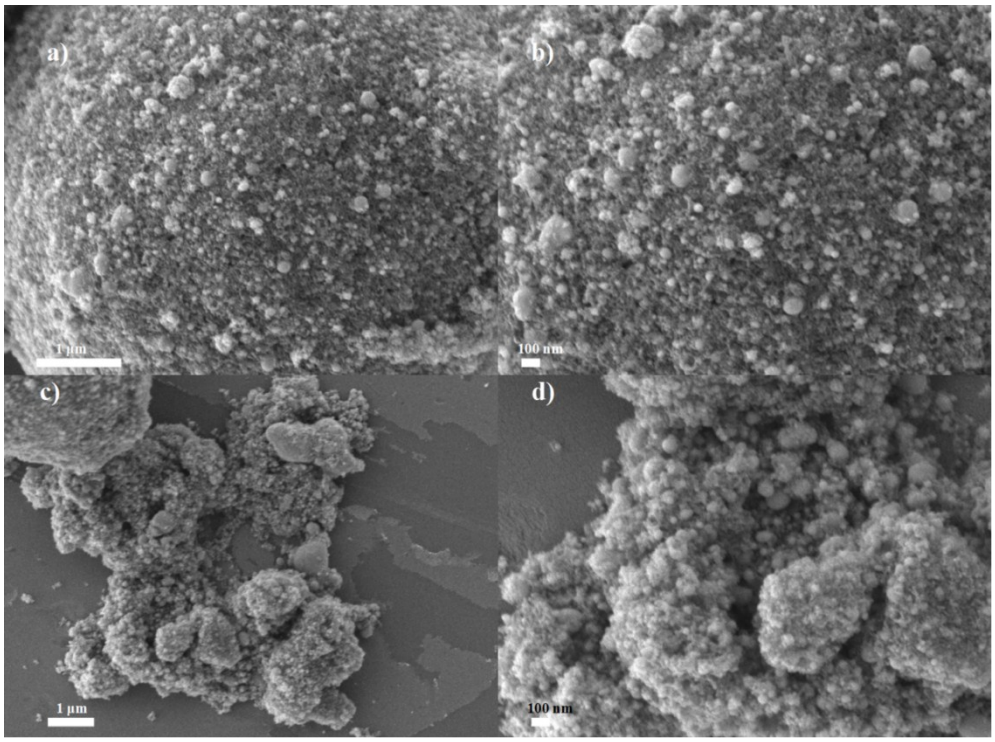


Figure S8 .SEM of CuNi/C-750

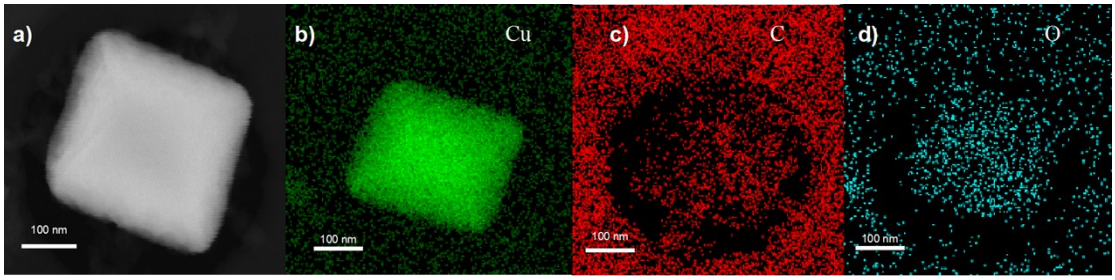


Figure S9. EDS of Cu/C-550.

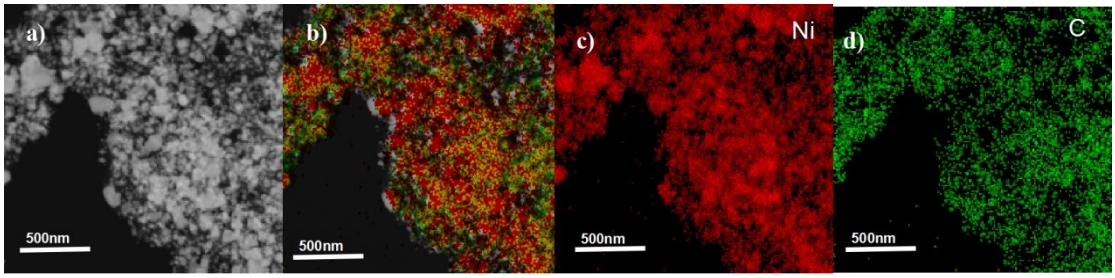
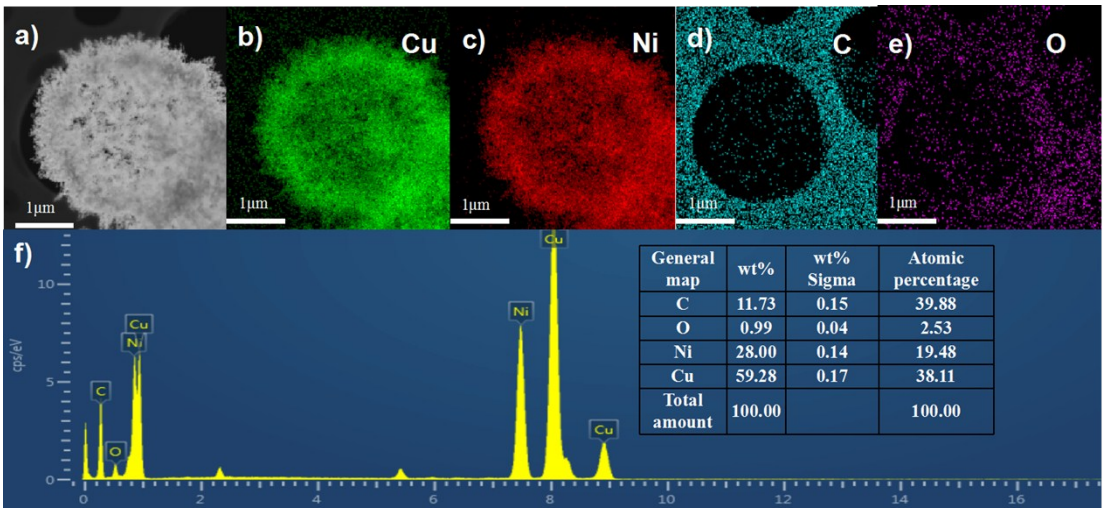
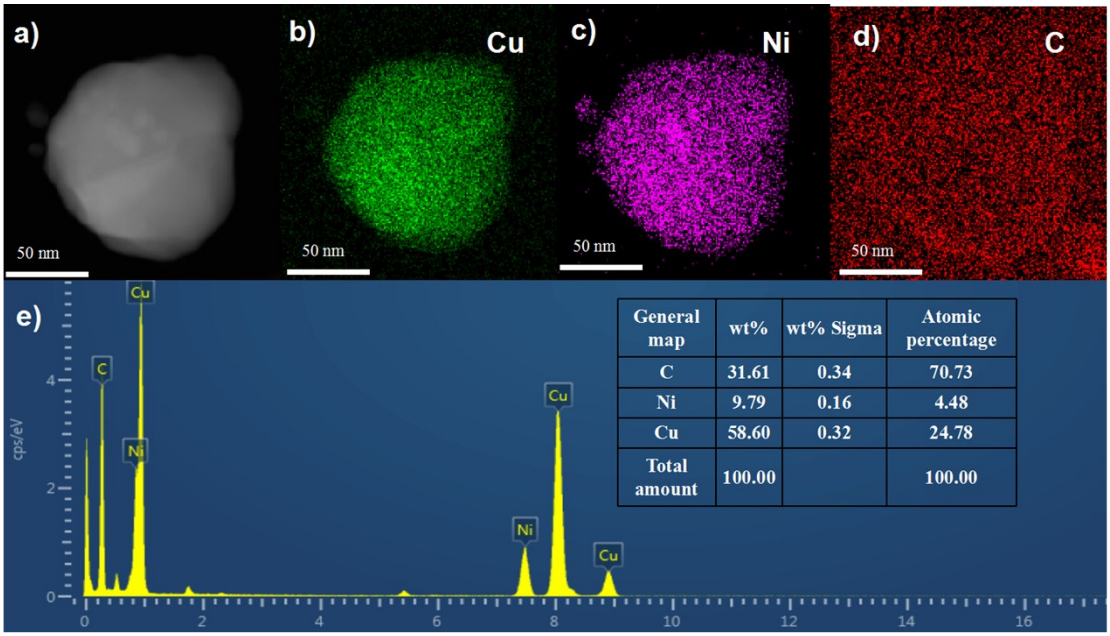


Figure S10. EDS of Ni/C-550.



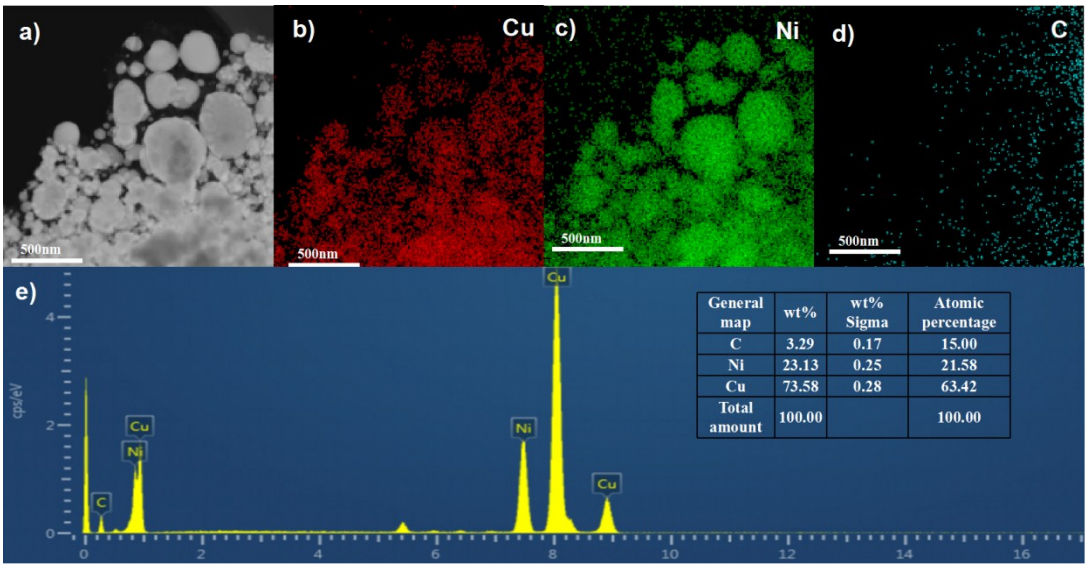
General map	wt%	wt% Sigma	Atomic percentage
C	11.73	0.15	39.88
O	0.99	0.04	2.53
Ni	28.00	0.14	19.48
Cu	59.28	0.17	38.11
Total amount	100.00		100.00

Figure S11. EDS of CuNi/C-450.



General map	wt%	wt% Sigma	Atomic percentage
C	31.61	0.34	70.73
Ni	9.79	0.16	4.48
Cu	58.60	0.32	24.78
Total amount	100.00		100.00

Figure S12. EDS of CuNi/C-650



General map	wt%	wt% Sigma	Atomic percentage
C	3.29	0.17	15.00
Ni	23.13	0.25	21.58
Cu	73.58	0.28	63.42
Total amount	100.00		100.00

Figure S13. EDS of CuNi/C-750

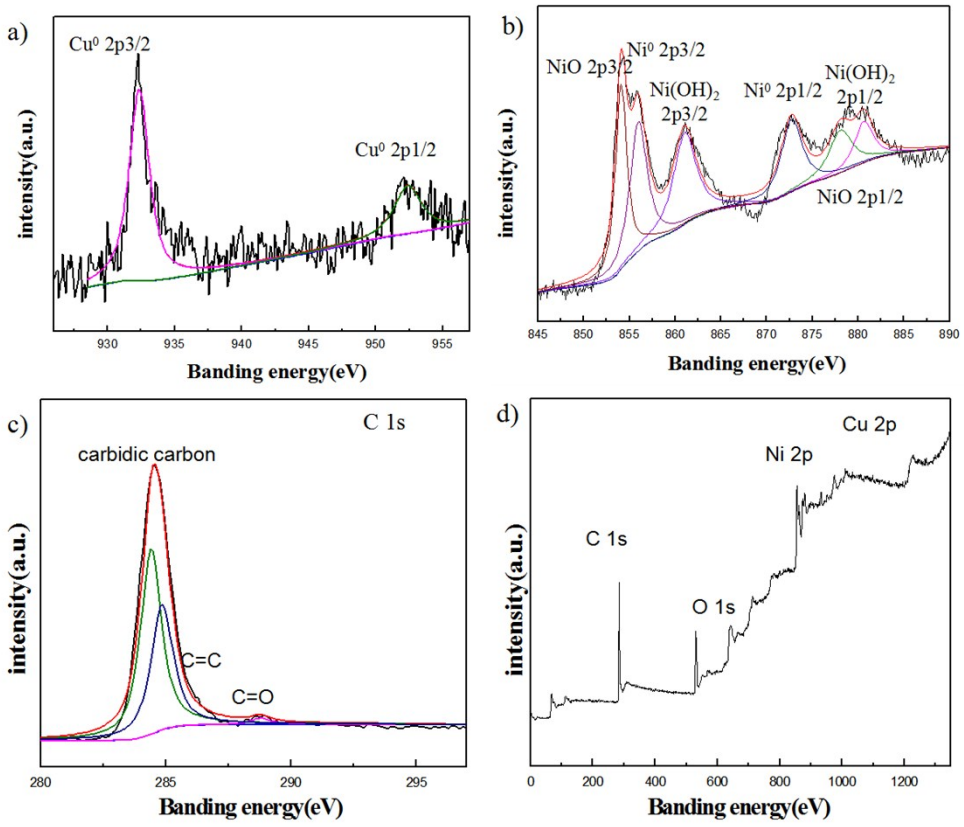


Figure S14. XPS of CuNi/C-450

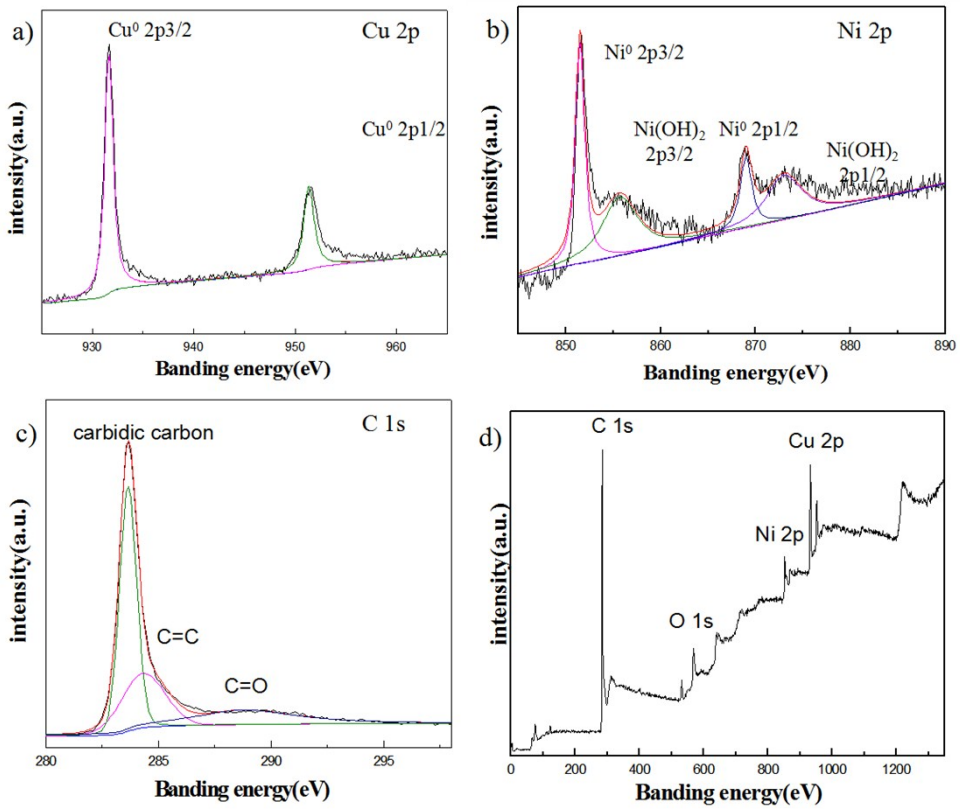


Figure S15. XPS of CuNi/C-650

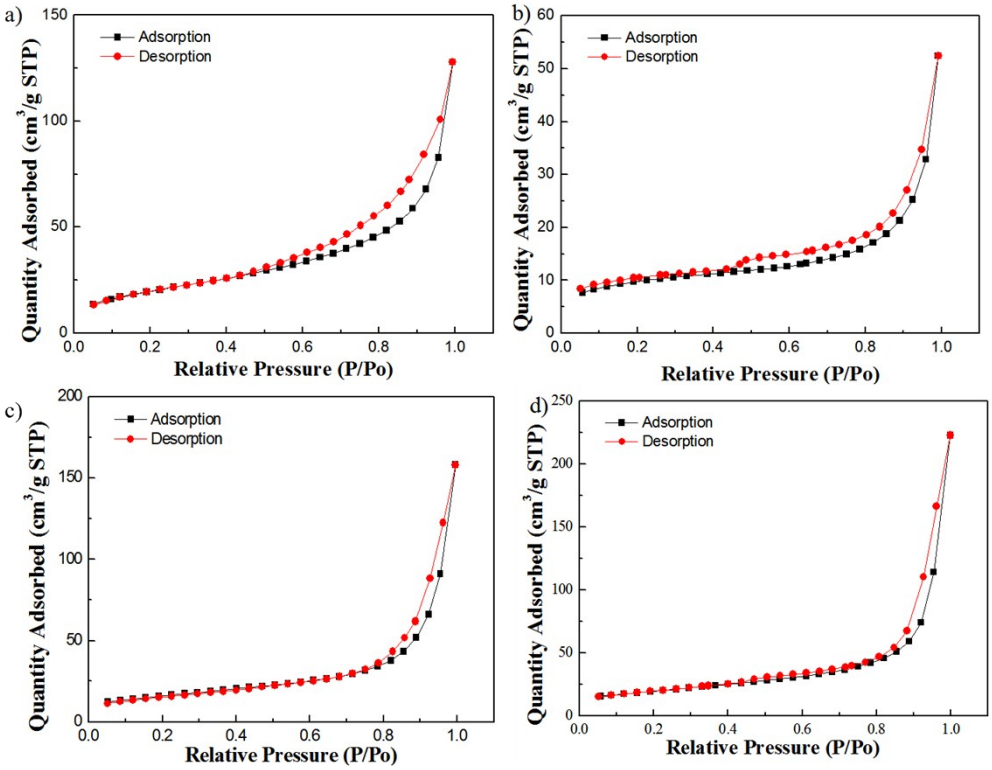


Figure S16 .Sample adsorption and desorption capacity for N_2 (a)Cu/C-550. (b)CuNi/C-450. (c)CuNi/C-550. (d)CuNi/C-650.

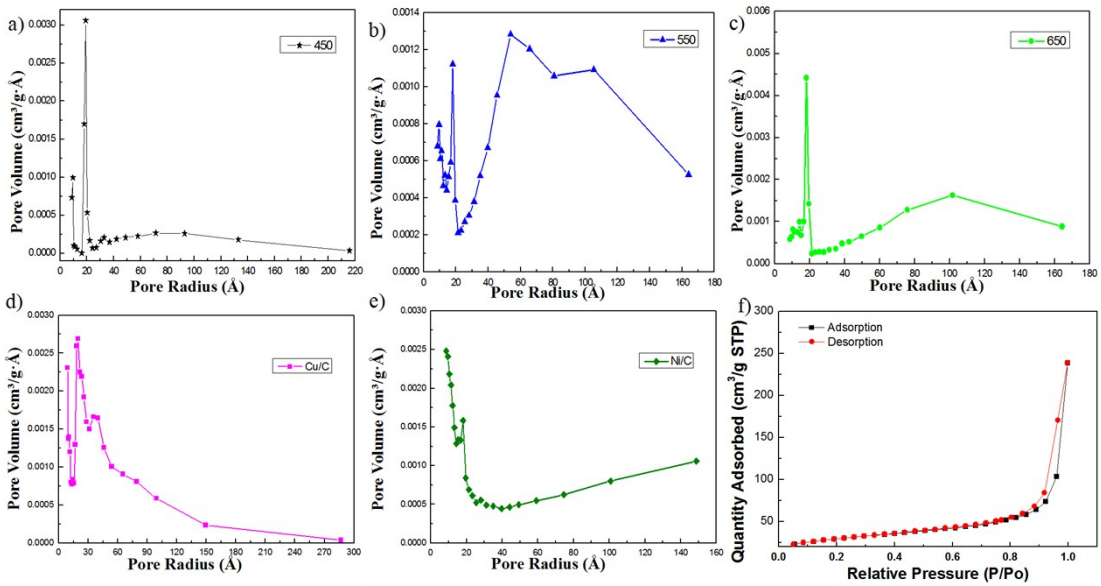


Figure S17 .Pore size distribution(a)CuNi/C-450. (b) CuNi/C-550. (c) CuNi/C-650. (d) Cu/C-550. (e) Ni/C-550. (f)Sample adsorption and desorption capacity for N_2

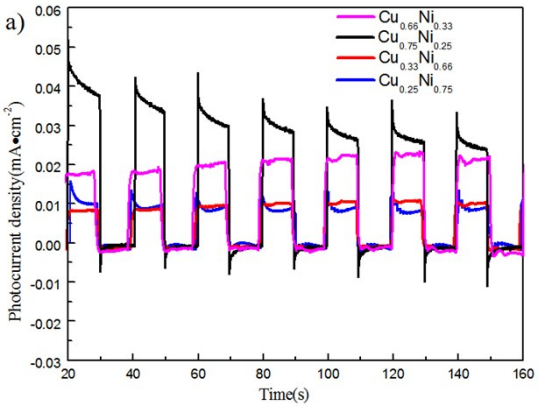


Figure S18. Electrical properties: photocurrent response of the samples.

Table S1. Gas precipitation under full light (without filter) under different conditions. (The catalyst added in all reactions is CuNi/C-550.)

Test Conditions	CO precipitation rate ($\mu mol \cdot g^{-1}h^{-1}$)	CH_4 precipitation rate ($\mu mol \cdot g^{-1}h^{-1}$)
Without TEOA	0	0
Without CO_2	0.012	0
Dark conditions	0	0
Without catalyst	0	0