

Triple Hierarchy and Double Synergies of NiFe/Co₉S₈/Carbon Cloth: A New and Efficient Electrocatalyst for Oxygen Evolution Reaction

Changhong Zhan^a, Zheng Liu^a, Yang Zhou^a, Mingliang Guo^a, Jinchun Tu^a, Lei Ding^{a,*} and Yang Cao^{a,b,†}

^a College of Materials and Chemical Engineering, State Key Laboratory of Marine Resource Utilization in South China Sea, Hainan University, Haikou 570228, China.

^b Qiongtai Normal University, Haikou 571127, Hainan, China

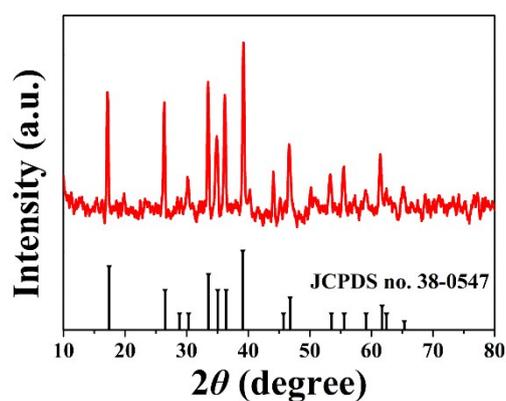


Fig. S1 XRD pattern of Co(CO)_{0.35}·Cl_{0.20}(OH)_{1.10}·1.74H₂O precursor.

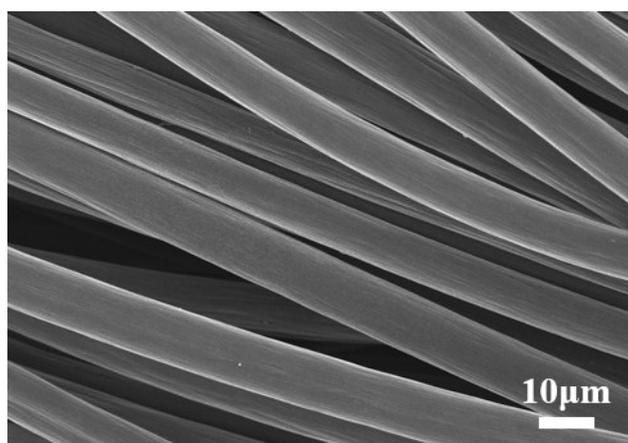


Fig. S2 SEM images of bare CC.

* E-mail address: Lding@hainu.edu.cn (L. Ding).

† E-mail address: cy507@hainu.edu.cn (Y. Cao)

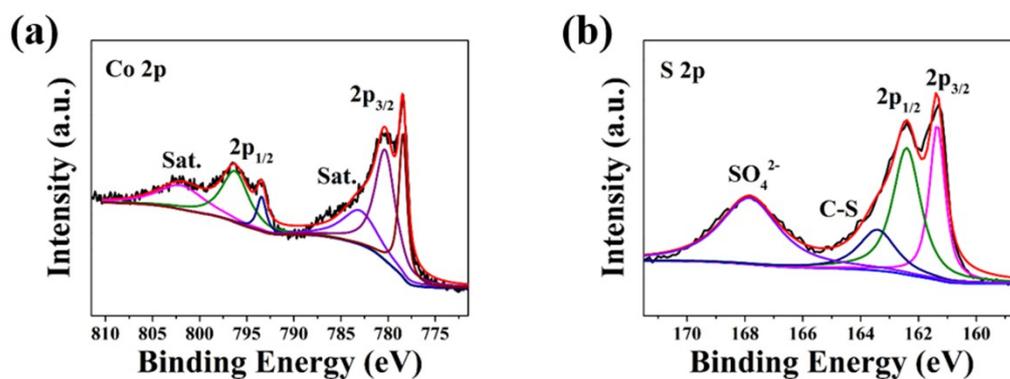


Fig. S3 XPS spectra of (a) Co 2p; (b) S 2p of Co_9S_8/CC .

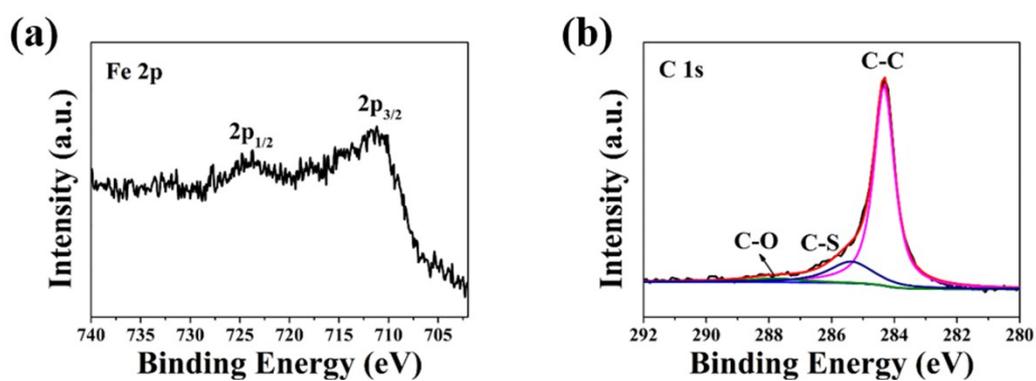


Fig. S4 XPS spectra of (a) Fe 2p; (b) C 1s of $NiFe/Co_9S_8/CC$.

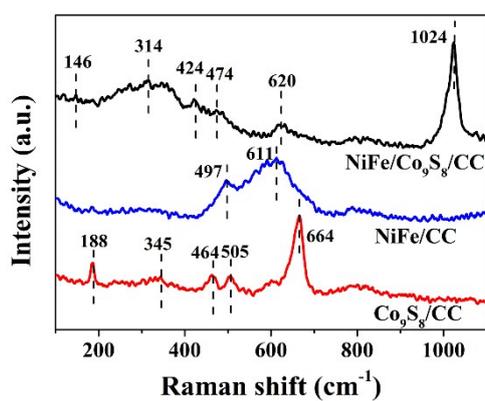


Fig. S5 Raman of $NiFe/Co_9S_8/CC$, $NiFe/CC$, and Co_9S_8/CC .

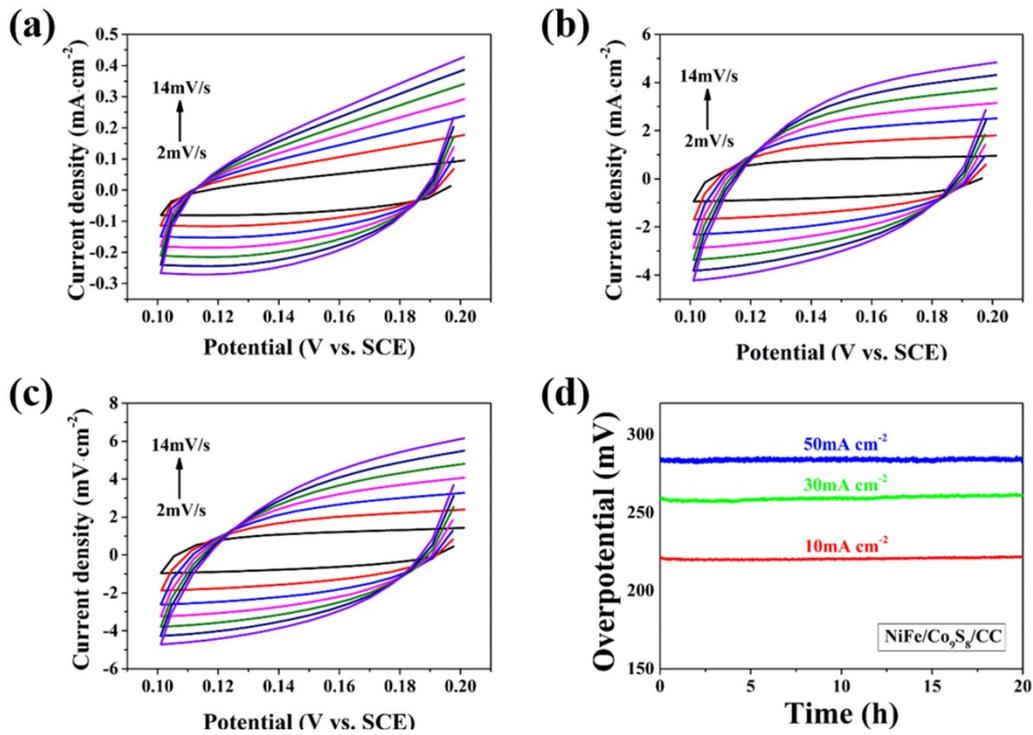


Fig. S6 CV curves of different electrodes in double layer region at various scan rates ranging from 2 to 14 mV s^{-1} : (a) NiFe/CC; (b) $\text{Co}_9\text{S}_8/\text{CC}$; (c) NiFe/ $\text{Co}_9\text{S}_8/\text{CC}$. (d) Stability of NiFe/ $\text{Co}_9\text{S}_8/\text{CC}$ at 10, 30, and 50mA cm^{-2} .

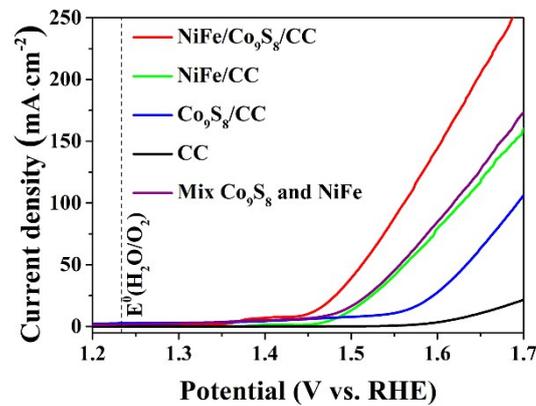


Fig. S7 The polarization curve of NiFe/ $\text{Co}_9\text{S}_8/\text{CC}$ and Mixing Co_9S_8 and NiFe.

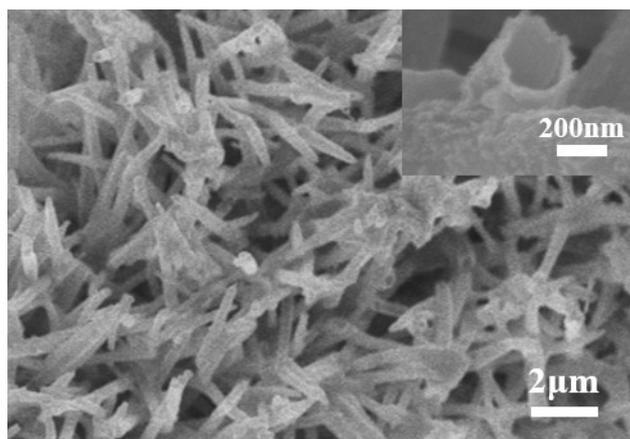


Fig. S8 SEM image of NiFe/Co₉S₈/CC after long-term stability test.

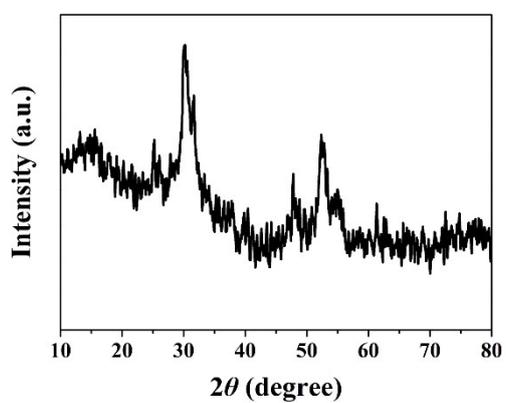


Fig. S9 XRD pattern of NiFe/Co₉S₈/CC after long-term stability test.

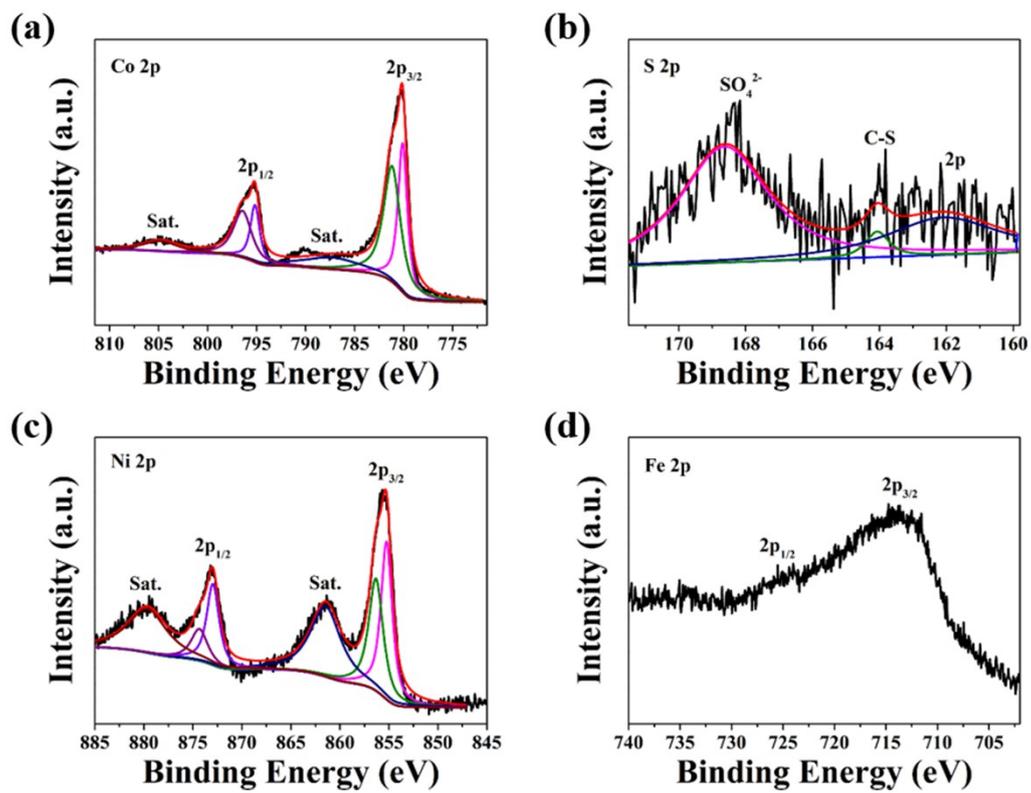


Fig. S10 XPS spectra of (a) Co 2p; (b) S 2p; (c) Ni 2p; (d) Fe 2p of NiFe/Co₉S₈/CC after long-term stability test.