

# Ultrathin ZIS Nanosheets Encapsulated in Metal-Organic-Framework-Derived CNCo-Fe<sub>3</sub>O<sub>4</sub> as Efficient Functional Photocatalyst for Hydrogen Evolution

Huihua Luo<sup>1</sup>, Lianqing Yu<sup>\*1</sup>, Kehui Xue<sup>1</sup>, Haifeng Zhu<sup>2</sup>, Yaping Zhang<sup>2</sup>

(1. School of materials science and engineering, China University of Petroleum, QingDao 266580

China.

2. College of Science, China University of Petroleum, QingDao 266580 China.)

\* Lianqing Yu Email: [iyy2000@163.com](mailto:iyy2000@163.com)

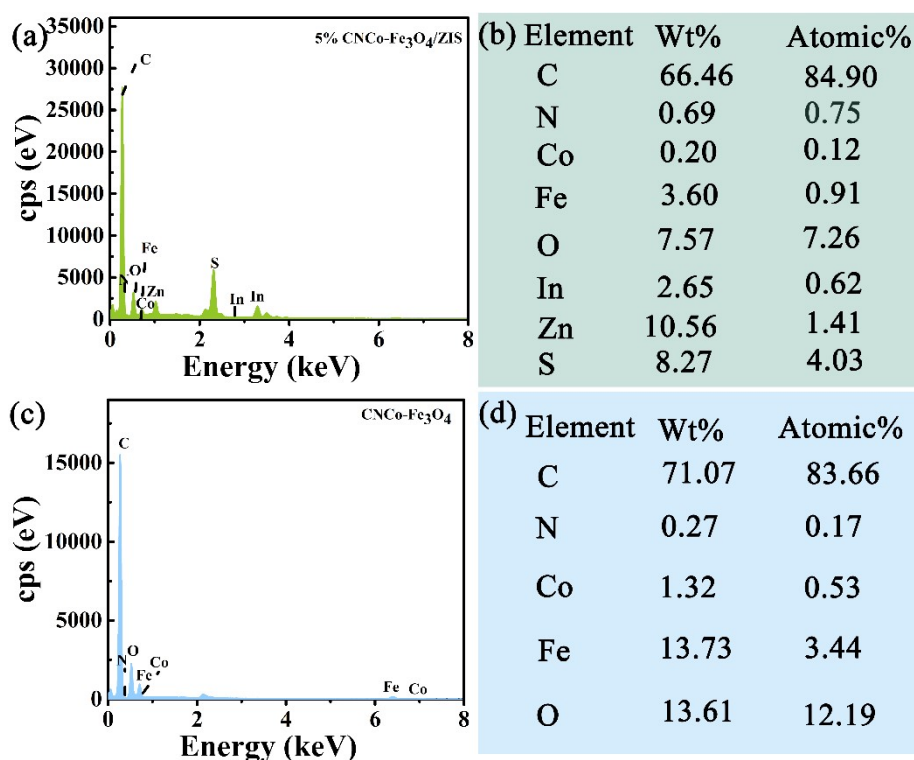


Fig. S1 EDS profiles and atomic ratio of elements in 5% CNCo-Fe<sub>3</sub>O<sub>4</sub>/ZIS heterojunction catalyst (a-b), CNCo-Fe<sub>3</sub>O<sub>4</sub> heterojunction catalyst, respectively (c-d).

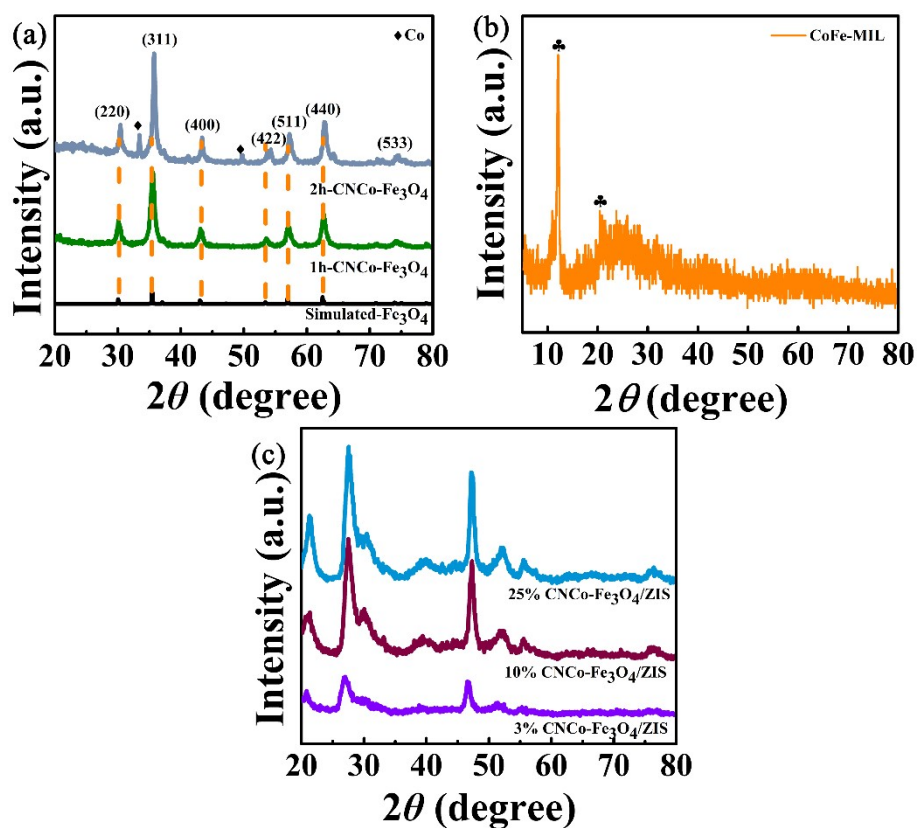


Fig. S2 XRD pattern of simulated-Fe<sub>3</sub>O<sub>4</sub>, 1h-CNC-Co-Fe<sub>3</sub>O<sub>4</sub> and 2h-CNC-Co-Fe<sub>3</sub>O<sub>4</sub> catalyst (a); CoFe-MIL (b); 3% CNC-Co-Fe<sub>3</sub>O<sub>4</sub>/ZIS, 10% CNC-Co-Fe<sub>3</sub>O<sub>4</sub>/ZIS and 25% CNC-Co-Fe<sub>3</sub>O<sub>4</sub>/ZIS heterojunction catalyst (c).

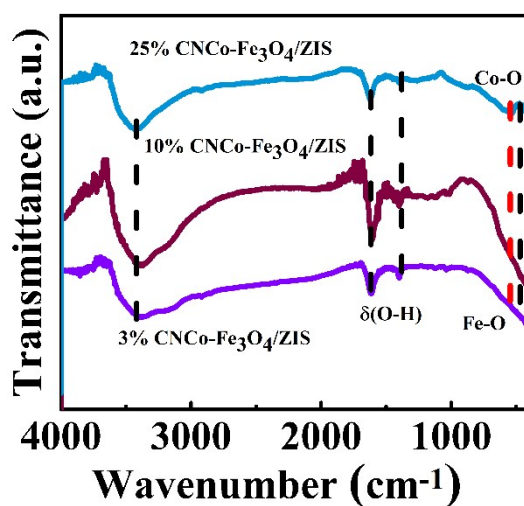


Fig. S3 FTIR of 3% CNC-Co-Fe<sub>3</sub>O<sub>4</sub>-ZIS, 10% CNC-Co-Fe<sub>3</sub>O<sub>4</sub>-ZIS and 25% CNC-Co-Fe<sub>3</sub>O<sub>4</sub>-ZIS heterojunction catalyst.

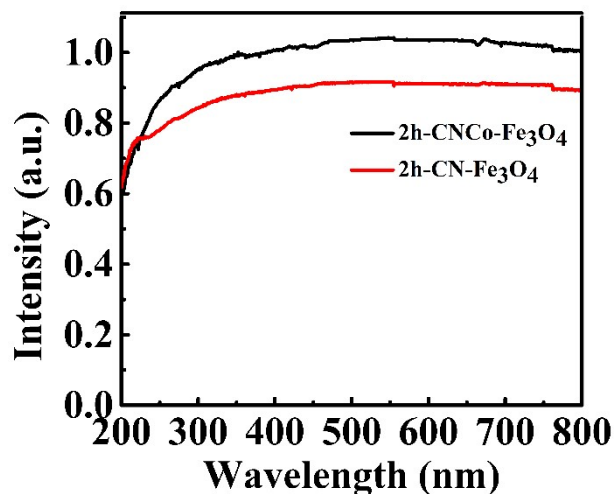


Fig. S4 UV-vis DRS spectra of 2h-CNCo-Fe<sub>3</sub>O<sub>4</sub> and 2h-CN-Fe<sub>3</sub>O<sub>4</sub> samples.

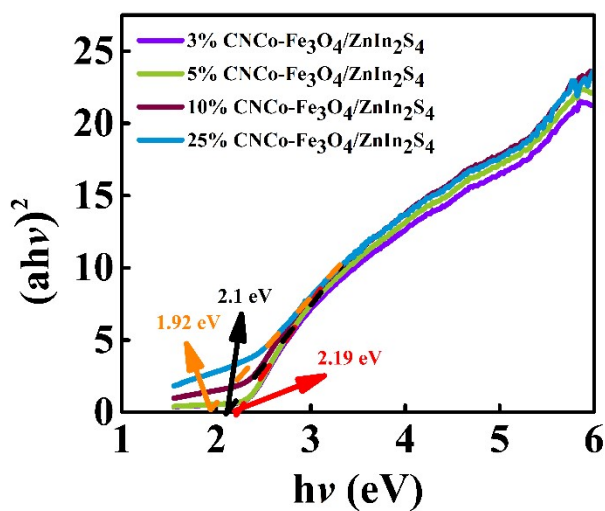


Fig. S5 The tauc plots of  $(\alpha h\nu)^2$  vs photon energy of 3% CNCo-Fe<sub>3</sub>O<sub>4</sub>/ZIS, 5% CNCo-Fe<sub>3</sub>O<sub>4</sub>/ZIS, 10% CNCo-Fe<sub>3</sub>O<sub>4</sub>/ZIS and 25% CNCo-Fe<sub>3</sub>O<sub>4</sub>/ZIS heterojunction catalyst.

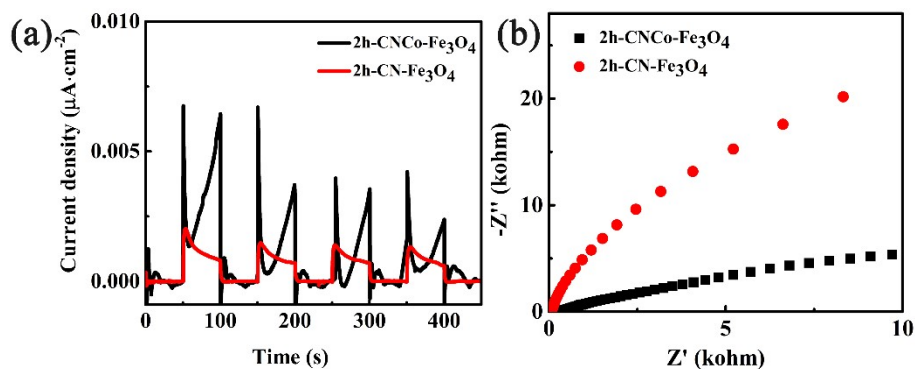


Fig. S6 (a) I-t and (b) EIS of 2h-CNCo-Fe<sub>3</sub>O<sub>4</sub> and 2h-CN-Fe<sub>3</sub>O<sub>4</sub> samples.

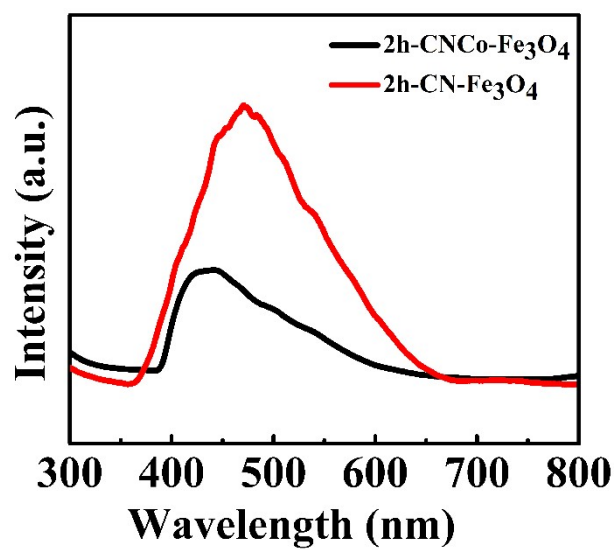


Fig. S7 PL spectra of 2h-CNCo-Fe<sub>3</sub>O<sub>4</sub> and 2h-CN-Fe<sub>3</sub>O<sub>4</sub> samples.