Support information

In situ formation Co-MOF/Ti-Fe_2O_3 photoanode for efficient photoelectrochemical water splitting

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Content

Chemical reagents

All the chemical reagents were not further purified. $FeCl_3 \cdot 6H_2O$ (≥98.0%), $TiCl_4$, $NaNO_3$, $Co(NO_3)_2 \cdot 6H_2O$, terephthalic acid (PTA), and ethylene glycol (EG) were purchased from Sinopharm Chemical Reagent Co. Polyvinylpyrrolidone (PVP) was purchased from Tianjin Tiantai Fine Chemicals Co. Anhydrous ethanol, ethyl acetate, acetone, potassium hydroxide, and hydrogen peroxide were purchased from Beijing Chemical Factory. And N,N-Dimethylformamide (DMF) was purchased from Shandong Yuwang and World New Materials Co. The experimental water was ultrapure water.

Supplementary figures

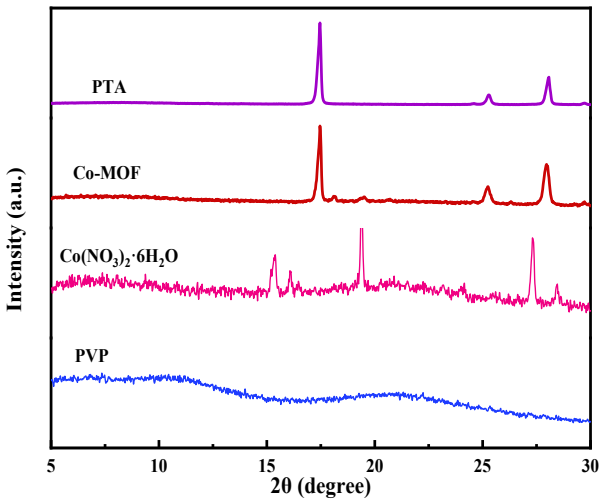

Figure S1 XRD patterns of Co-MOF, $Co(NO_3)_2 \cdot 6H_2O$, PVP and PTA.

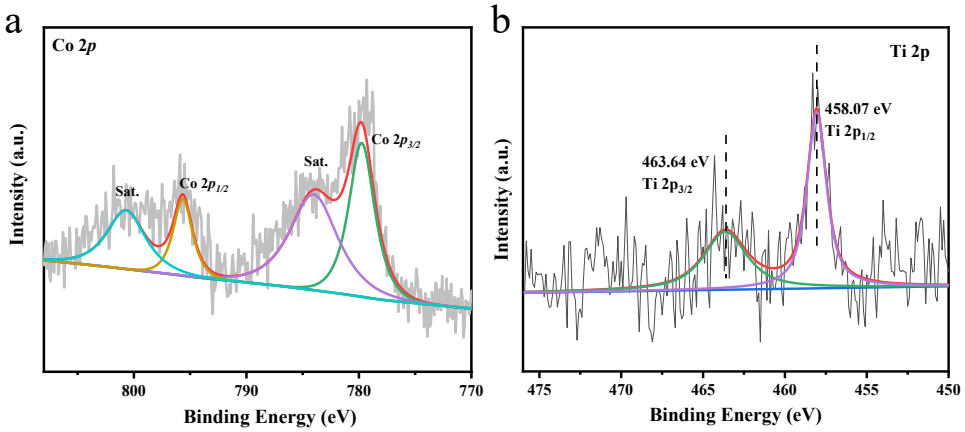

Figure S2 XPS spectra for (a) Co 2*p* of Co-MOF, (b) Ti 2*p* of Co-MOF/Ti-Fe_2O_3.

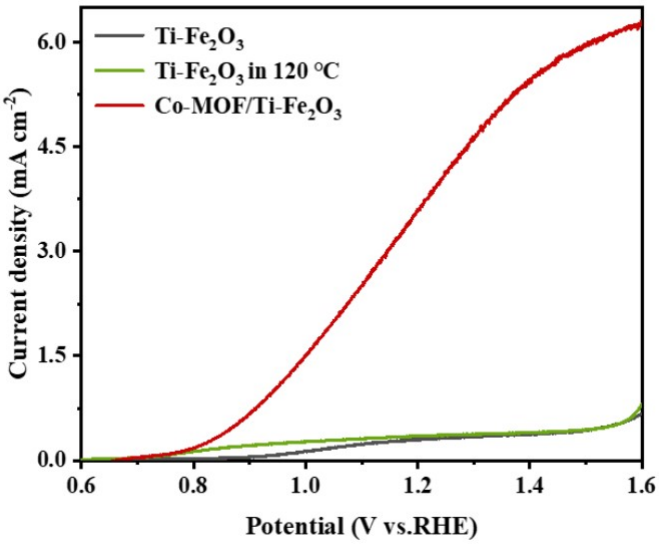

Figure S3 LSV curves under the influence of solvents of Co-MOF/Ti-Fe_2O_3 photoanodes.

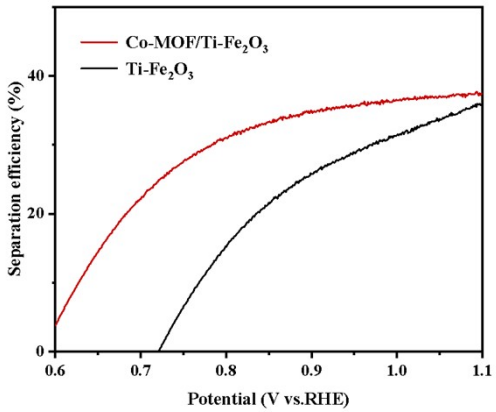

Figure S4 The separation efficiency of Ti-Fe_2O_3 and Co-MOF/Ti-Fe_2O_3.

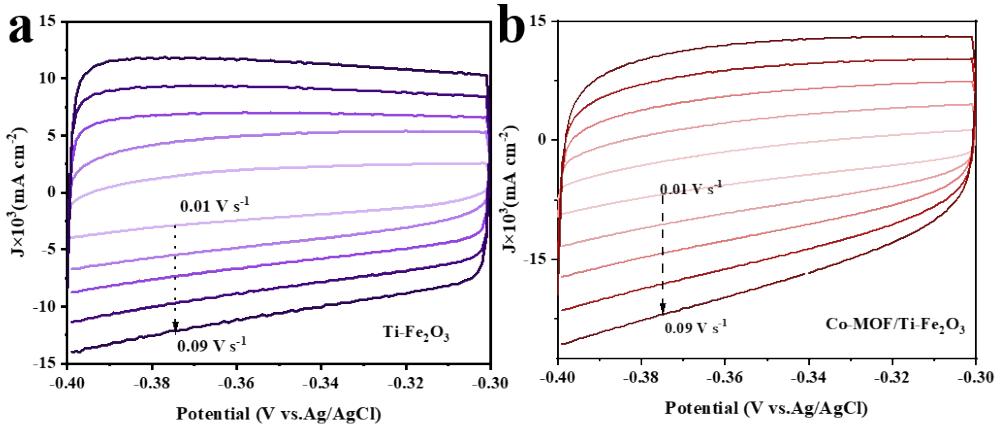

Figure S5 CV curves of Ti-Fe_2O_3 and Co-MOF/Ti-Fe_2O_3 photoanodes.

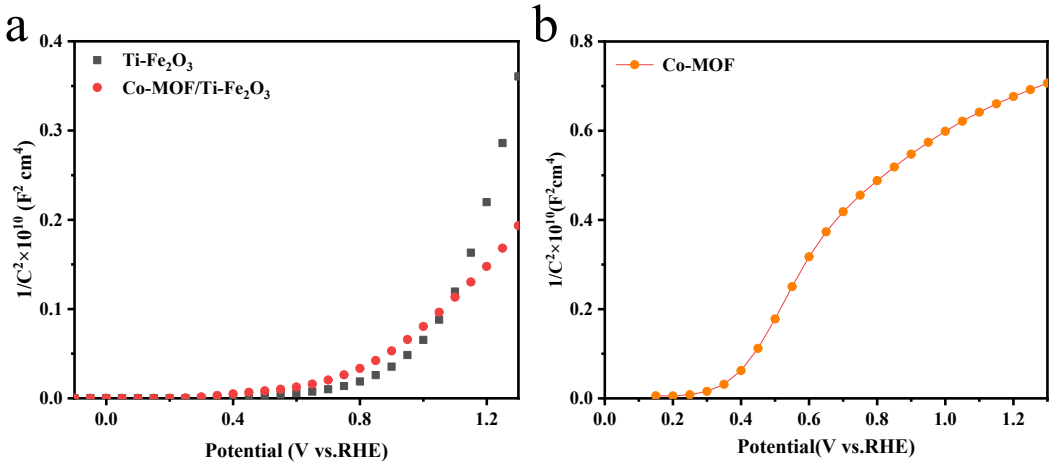

Figure S6 Mott-Schottky curves of (a) Ti-Fe_2O_3, Co-MOF/Ti-Fe_2O_3 photoanodes, (b) Co-MOF.

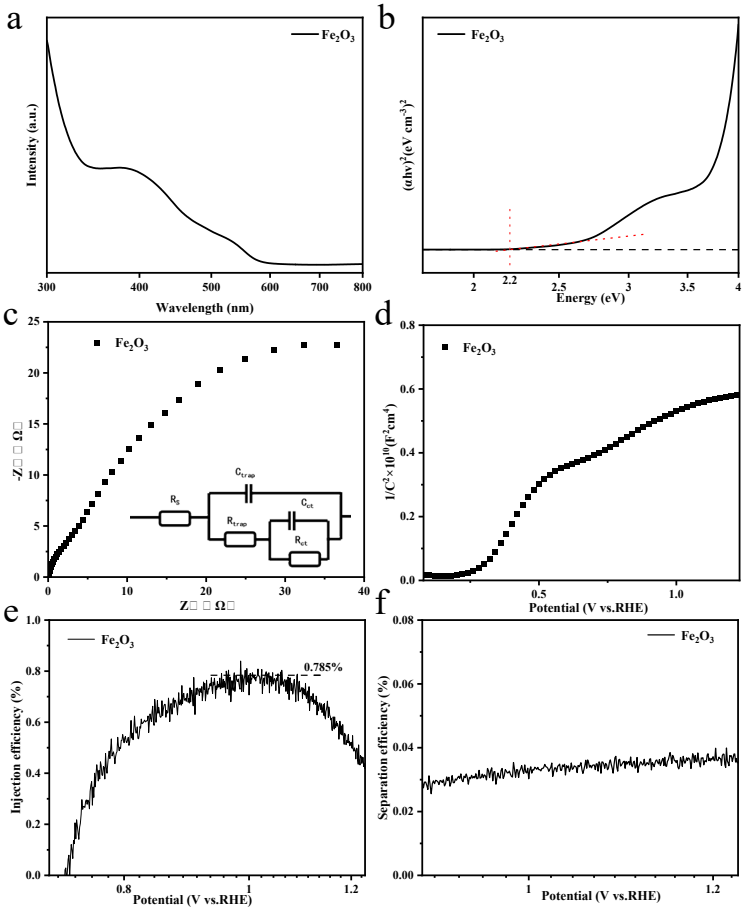

Figure S7 (a) UV-vis spectra; (b) Tauc plot; (c) PEIS; (d) Mott-Schottky curve; (e) η_{inj} curve, (f) η_{sep} curve of Fe_2O_3.

Supplementary Tables：

Table S1. EIS fitting results of Ti-Fe_2O_3 and Co-MOF/Ti-Fe_2O_3 under AM 1.5 G illumination.

Table 1. EIS fitting results of Ti-Fe_2O_3 and Co-MOF/Ti-Fe_2O_3 photoanodes					
Photoanode	R_S (Ω)	R_{bulk}(Ω)	CPE1(F/cm^2)	R_{ct}(Ω)	CPE2(F/cm^2)
Ti-Fe_2O_3	68.71	402.1	9.6476×10^{-6}	2068	0.83469
Co-MOF/Ti-Fe_2O_3	63.35	211.5	2.919×10^{-5}	696	0.87179

Table S2. N_d (cm^{-3}) of Ti-Fe_2O_3, Co-MOFs/Ti-Fe_2O_3 photoanodes.

Photoanode	Ti:Fe_2O_3	Co-MoF/Ti-Fe_2O_3
N_d (cm^{-3})	1.6×10^{20}	4.9×10^{20}