Supporting Information

Application of surface complexation modeling on modification of hematite surface with cobalt cocatalysts: a potential tool for preparing homogeneously distributed catalysts

By TsingHai Wang,* Hsin-Ting Hung, Wei Wang, Po-Chieh Li, Yi-Kong Hsieh, Yingchao Dong, Chu-Fang Wang,*

Table S1 The properties of Co-loaded hematite samples prepared in this study

Sample	Initial Co^{2+} concentration (M)	equilibrated pH (± 0.2)	Hematite added (g)	loaded Co (mol/g)	RhB degradation rate (min^{-1})	Photocurrent density ($\mu A/cm^2$)
A	10^{-2}	10	1	1.00×10^{-3}	2.48×10^{-3}	9.03
B	10^{-2}	10	3	3.33×10^{-4}	6.34×10^{-3}	8.66
C	10^{-2}	10	6	1.67×10^{-4}	4.60×10^{-3}	8.69
D	10^{-2}	10	8	1.25×10^{-4}	1.45×10^{-2}	8.95
E	10^{-2}	10	10	1.00×10^{-4}	6.01×10^{-3}	7.32
F	10^{-3}	7	1	5.28×10^{-4}	6.08×10^{-3}	9.22
G	10^{-3}	7	3	1.76×10^{-4}	5.16×10^{-3}	6.76
H	10^{-3}	7	6	8.80×10^{-5}	1.32×10^{-2}	5.98
I	10^{-3}	7	8	6.60×10^{-5}	1.88×10^{-2}	5.46
J	10^{-3}	7	10	5.28×10^{-5}	1.11×10^{-2}	4.99
K	10^{-3}	4	1	2.00×10^{-5}	2.53×10^{-2}	3.06
L	10^{-4}	4	1	2.00×10^{-6}	2.88×10^{-2}	2.01
M	10^{-5}	7	1	1.00×10^{-6}	3.63×10^{-2}	2.00
N	10^{-5}	4	1	5.00×10^{-7}	2.67×10^{-2}	1.88
O	0	7	1	0	2.95×10^{-2}	1.22

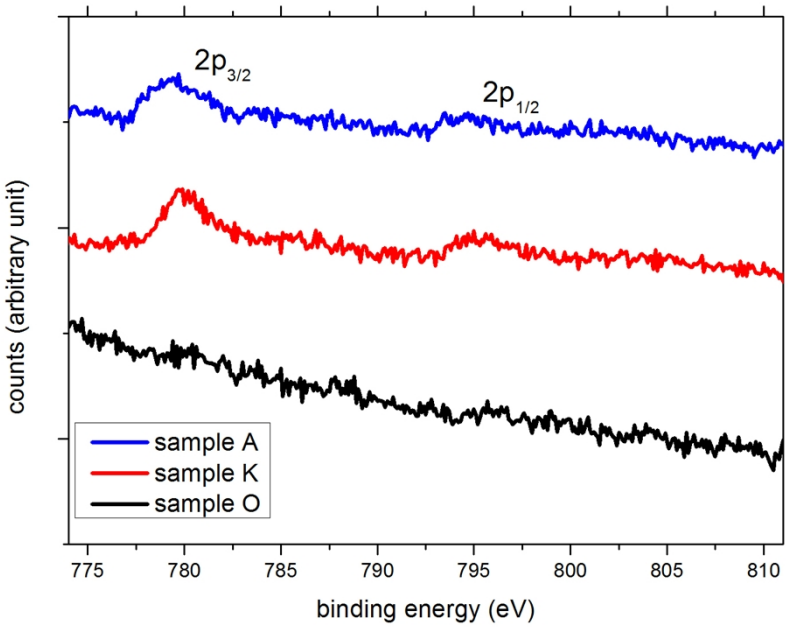


Figure S1 The XPS spectra of Co_3O_4 loaded hematite samples. It is worth mentioning that although we can identify the phase of loaded Co cocatalysts, the intensity of this Co_3O_4 phase is too weak to be observed in XRD analysis, even in the sample A, which has the highest Co_3O_4 loading of 1.0 mmol-Co/g-hematite.

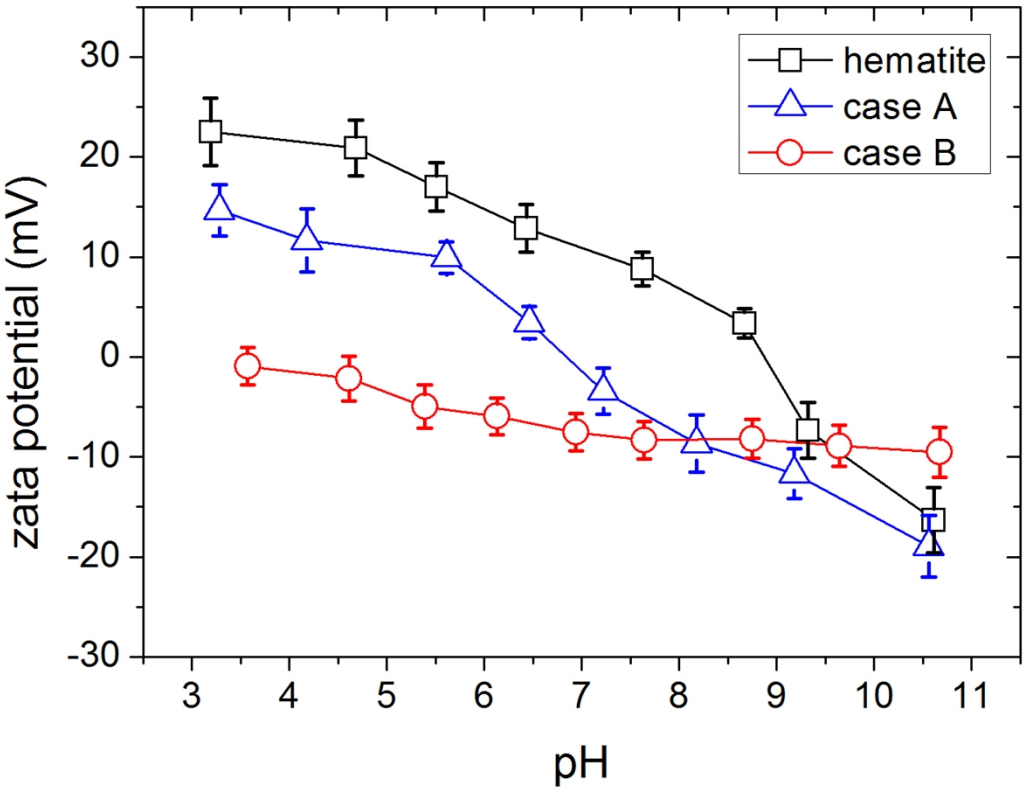


Figure S2 The zeta potential of samples collected from case A, case B and unmodified hematite particles. Condition: 0.1 g sample in 100 mL 1.0 mM NaCl solution.

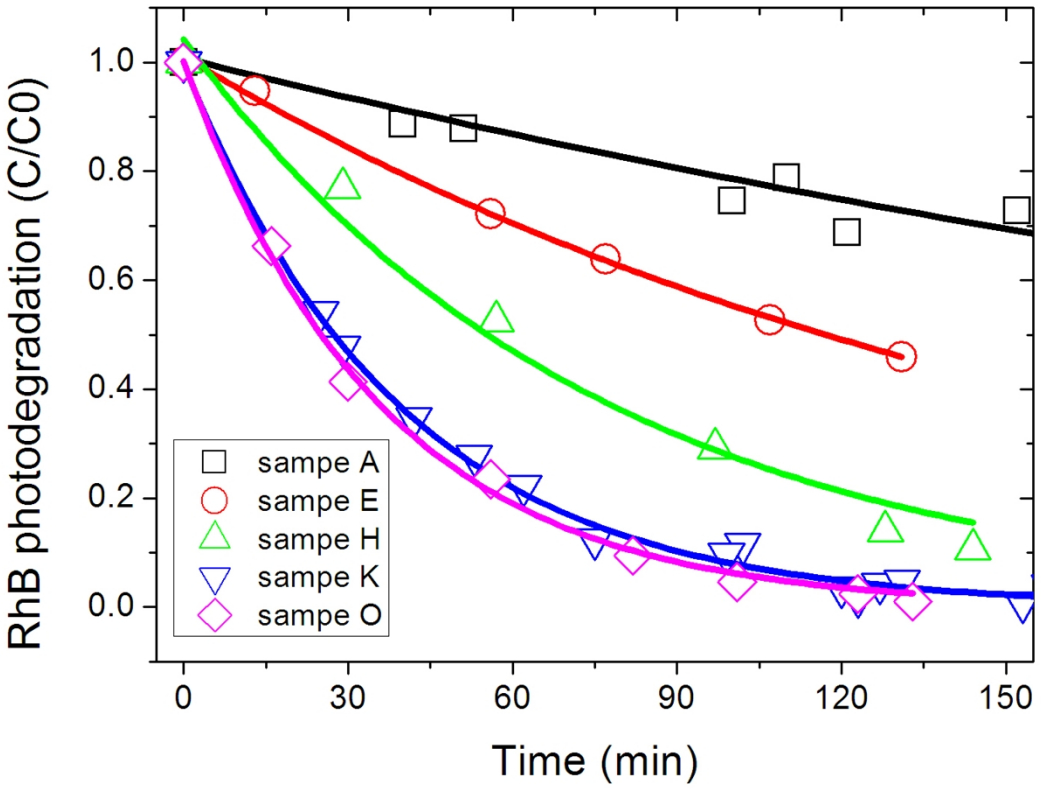
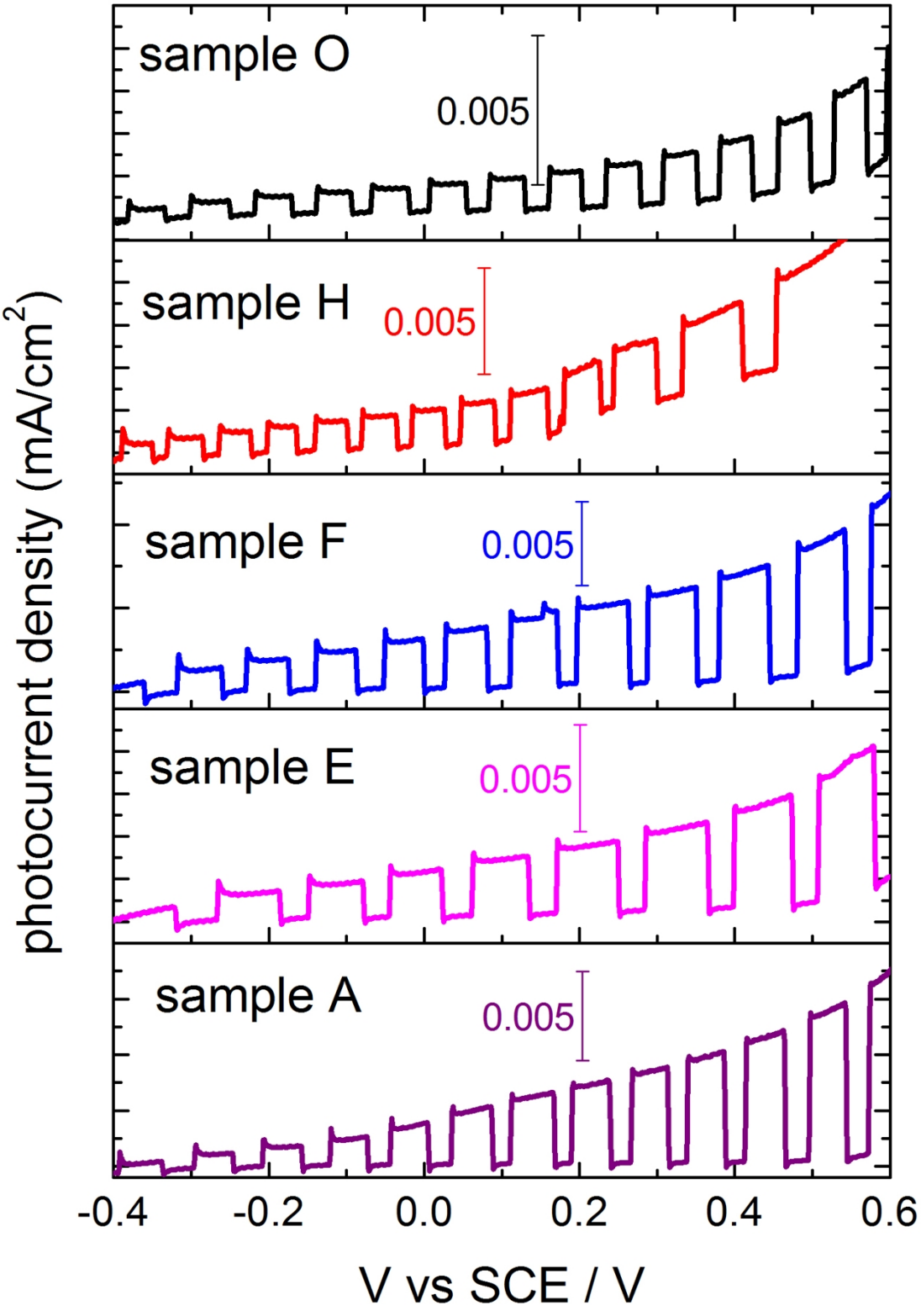


Figure S3 The representative photodegradation of RhB dye by different hematite samples.



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33 Figure S4 The representative photocurrent of different hematite samples.

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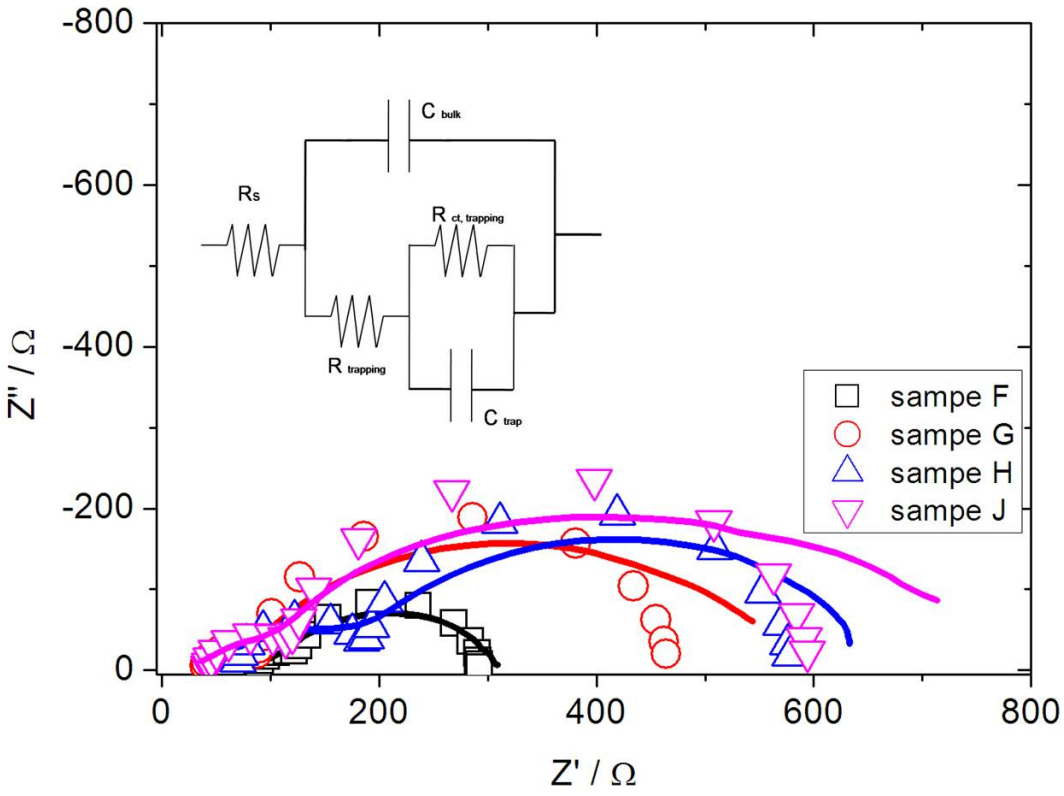

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36 Figure S5 The representative EIS spectra collected under illumination with an applied potential of

37 0.4 V vs SCE.

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