Supporting Information

Effect of acid treatment on boosting the photoelectrochemical performance of doped and codoped α-Fe_2O_3 photoanodes

Yujie Wang*, Jinlong Liu, Jie Xu, Xiaobin Hao

Address: School of Materials and Chemical Engineering, Chuzhou University, Chuzhou, Anhui 239000, China

Email: wangyj120@163.com

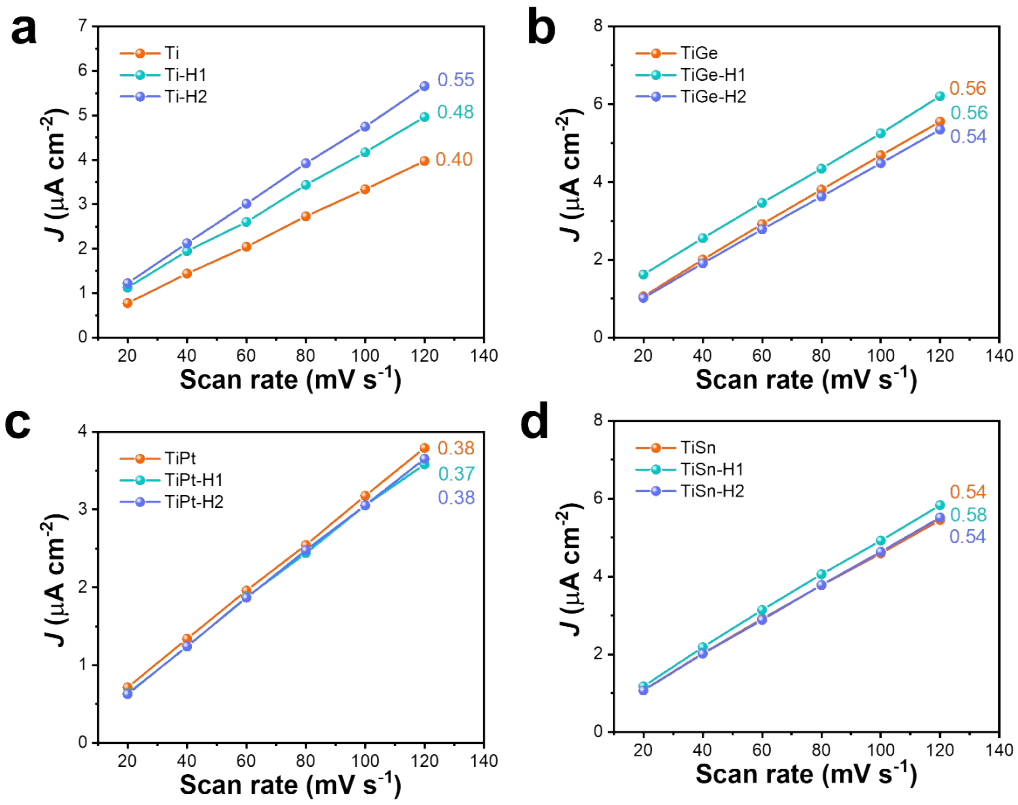

Fig. S1. The plots of the capacity current differences (at 0 V vs. Hg/HgO) against scan rates, where the liner slope equals twice the C_{dl}.

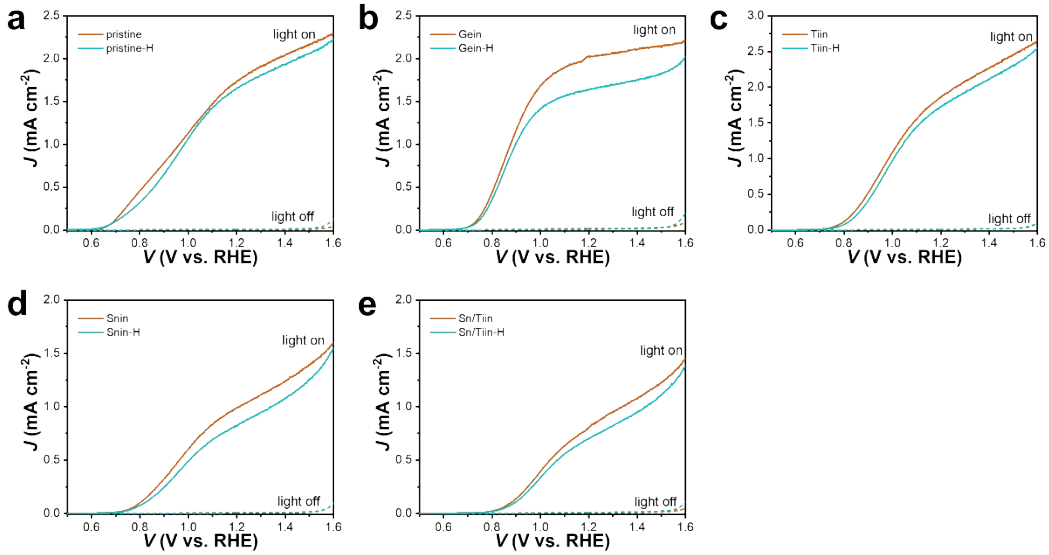

Fig. S2. Photocurrent density vs. potential (J-V) curves of the (a) pristine, (b) Ge_{in}, (c) Ti_{in}, (d) Sn_{in} and (e) Sn/Ti_{in} photoanodes before and after HCl treatments for 1 h.

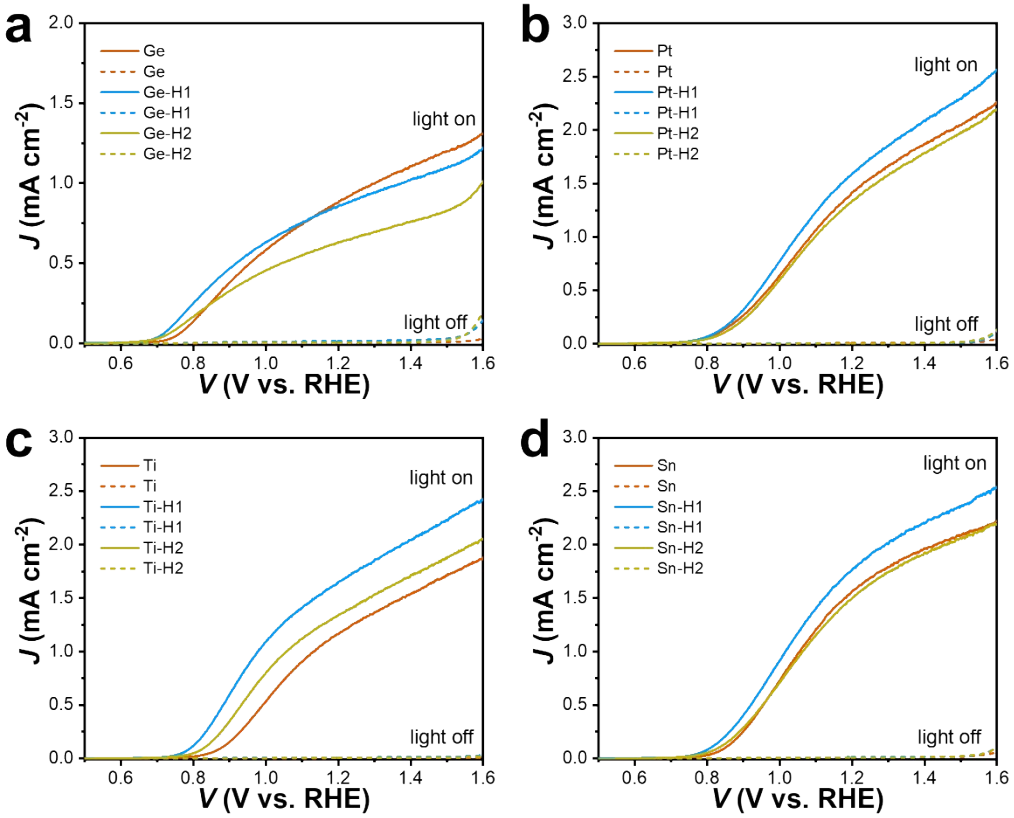

Fig. S3. Photocurrent density vs. potential (J-V) curves of the (a) Ge, (b) Pt, (c) Ti and (d) Sn electrodes before and after HCl treatments for 1 h and 2 h.

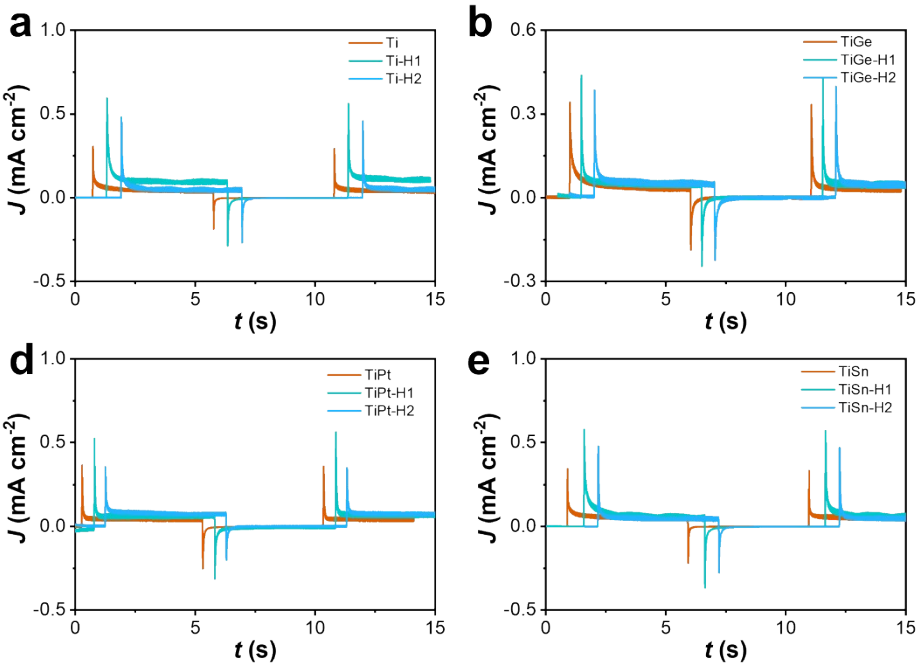

Fig. S4. Transient photocurrents of the (a) Ti, (b) TiGe, (c) TiPt and (d) TiSn photoanodes measured at 0.84 V_{RHE}.

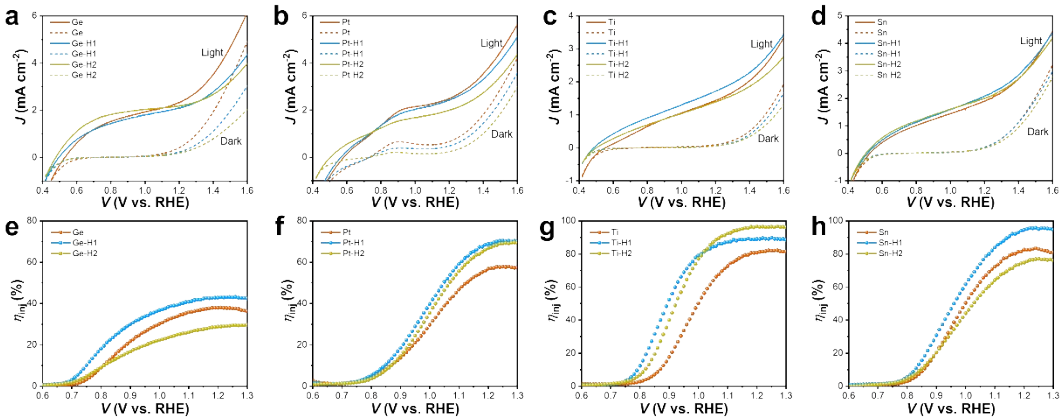

Fig. S5. Photocurrent density vs. potential (J-V) curves of the (a) Ge, (b) Pt, (c) Ti and (d) Sn photoanodes before and after HCl treatments for 1 h and 2 h measured in electrolyte with H_2O_2 as the hole trapping agent. Calculated charge injection efficiencies (η_{inj}) of the (e) Ge, (f) Pt, (g) Ti and (h) Sn photoanodes before and after HCl treatments for 1 h and 2 h.

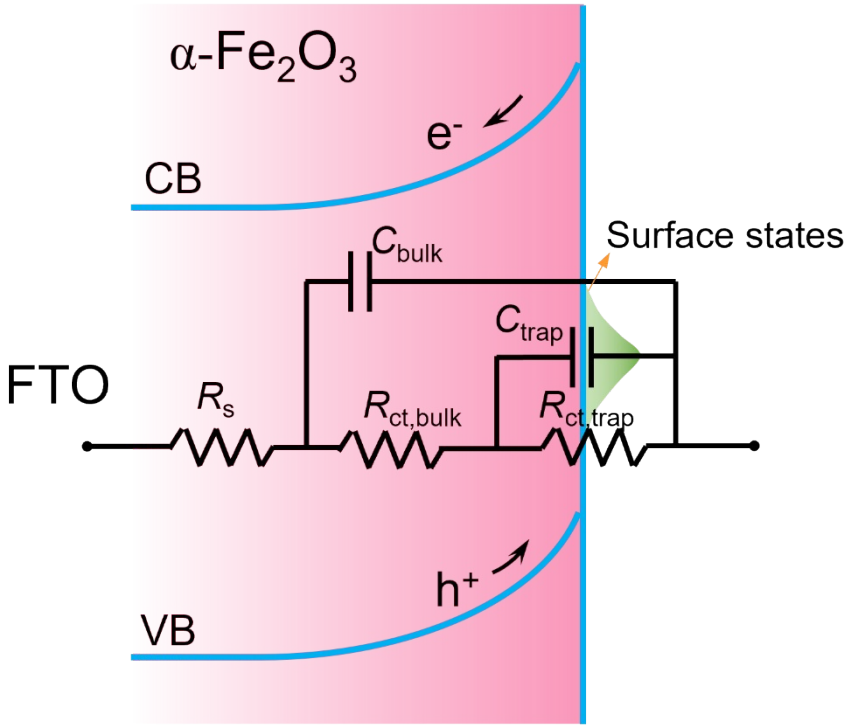

Fig. S6. Equivalent circuit for fitting the charge resistances and capacities in the α-Fe_2O_3 photoanode.

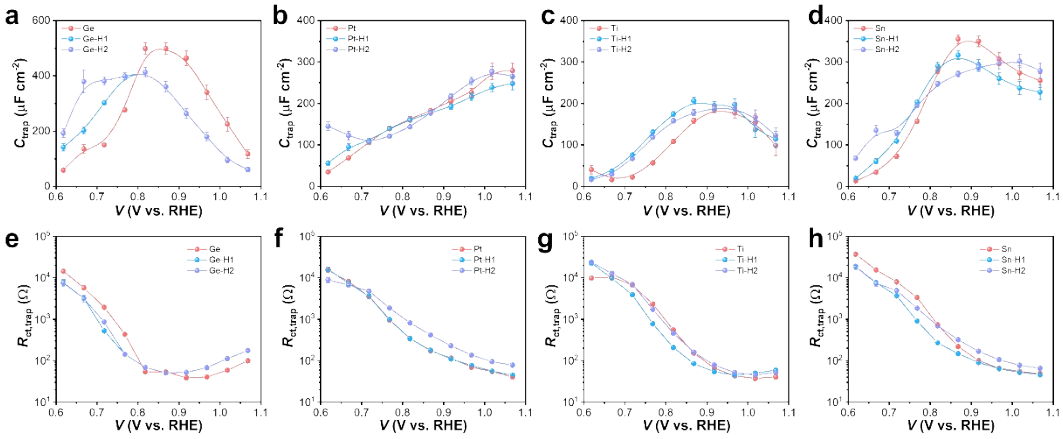

Fig. S7. Trap capacities (C_{trap}) of the (a) Ge, (b) Pt, (c) Ti and (d) Sn photoanodes before and after HCl treatments for 1 h and 2 h. Charge transfer resistances ($R_{ct,trap}$) of the (e) Ge, (f) Pt, (g) Ti and (h) Sn photoanodes before and after HCl treatments for 1 h and 2 h.