Electronic Supplementary Material (ESI) for Nanoscale.

Iron ions irradiated Bi_2Te_3 nanosheets with defects and regulated hydrophilicity to enhance hydrogen evolution reaction

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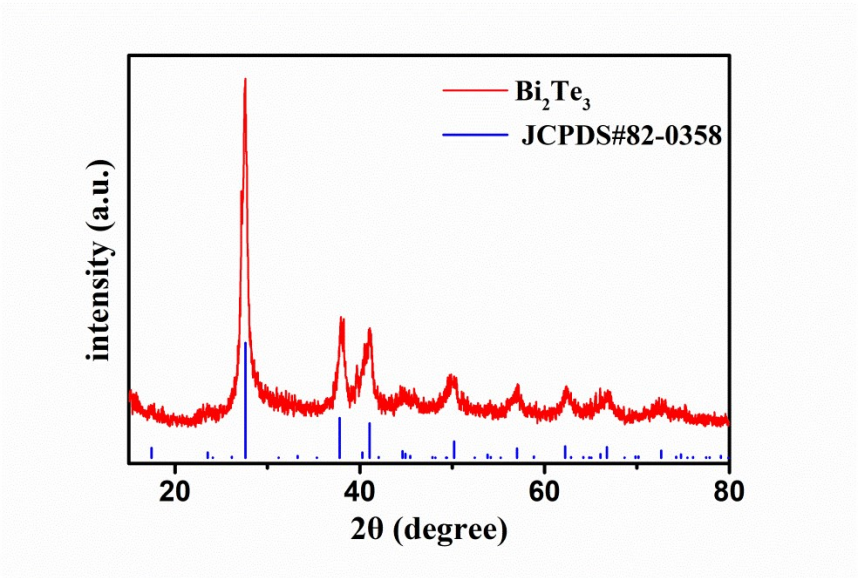

Fig. S1 XRD pattern of Bi_2Te_3 nanosheets.

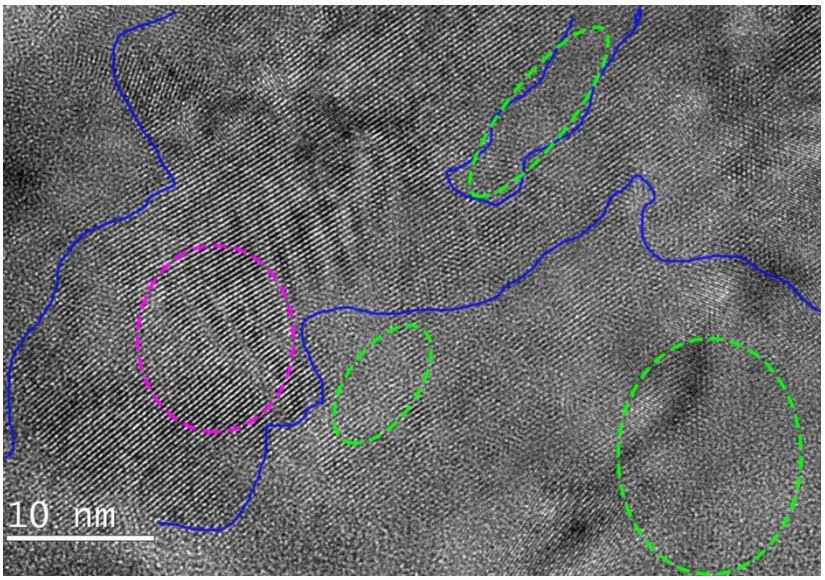

Fig. S2 HRTEM image of as-prepared Fe-Bi_2Te_3 nanosheets.

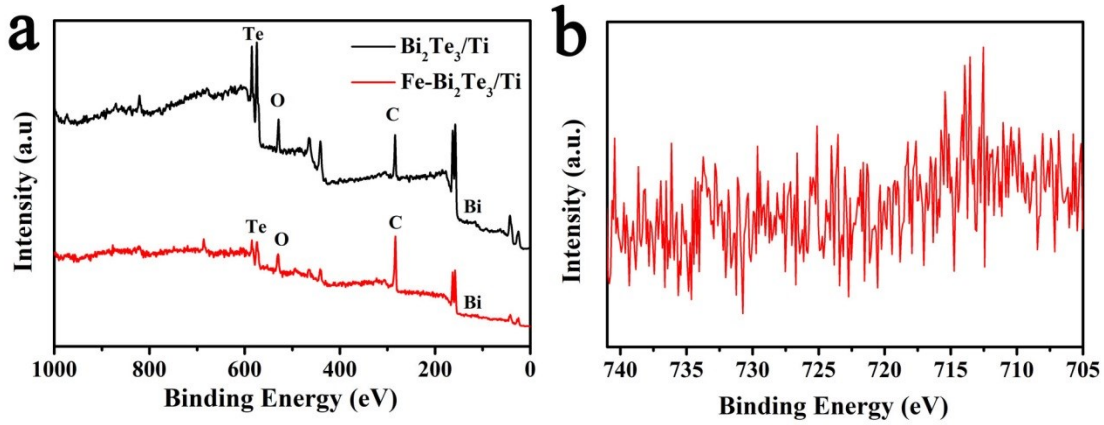

Fig. S3 (a) XPS spectra of Bi_2Te_3/Ti and Fe-Bi_2Te_3/Ti, (b) Fe 2p spectrum of Fe-Bi_2Te_3/Ti.

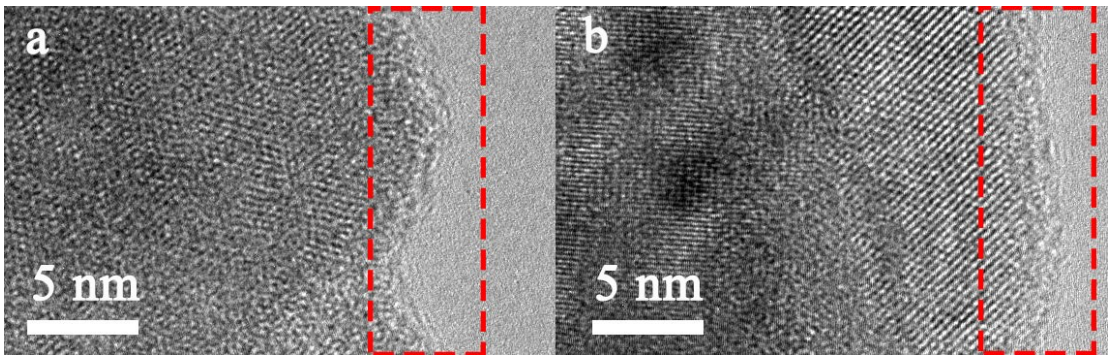

Fig. S4 (a) and (b) HRTEM images of Fe-Bi_2Te_3 nanosheets.

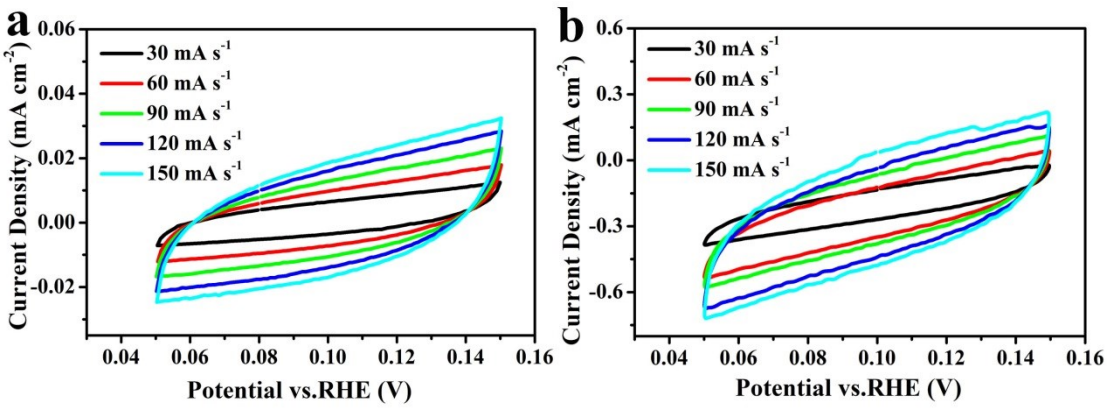

Fig. S5 The CV measurements of (a) Fe-Bi_2Te_3/Ti and (b) Bi_2Te_3/Ti in the potential region of 0.05-0.15 V (vs. RHE) in 0.5 M H_2SO_4.

The ECSA can be calculated from the C_{dl} according to:

$$RF = \frac{C_{dl}}{C_s}$$

Where, C_s is the capacitance of a flat standard electrode with 1 cm^2 of real surface area, which is generally in the range of 20 to 60 μF·cm^{-2}. The C_s value used here is 40 μF·cm^{-2}.

The RF (Roughness Factor) of Fe-Bi_2Te_3/Ti:

$$RF = \frac{C_{dl}}{C_s} = \frac{1.26\ mF\ cm^{-2}}{40 \mu F\ cm^{-2}} = 31.5$$

The RF of Bi_2Te_3/Ti:

$$RF = \frac{C_{dl}}{C_s} = \frac{0.11\ mF\ cm^{-2}}{40\ \mu F\ cm^{-2}} = 2.8$$

The ECSA of Fe-Bi_2Te_3/Ti, where A is the area:

$$ECSA = RF \times A = 31.5\ cm^{-2}$$

The ECSA of Bi_2Te_3/Ti:

$$ECSA = RF \times A = 2.8\ cm^{-2}$$

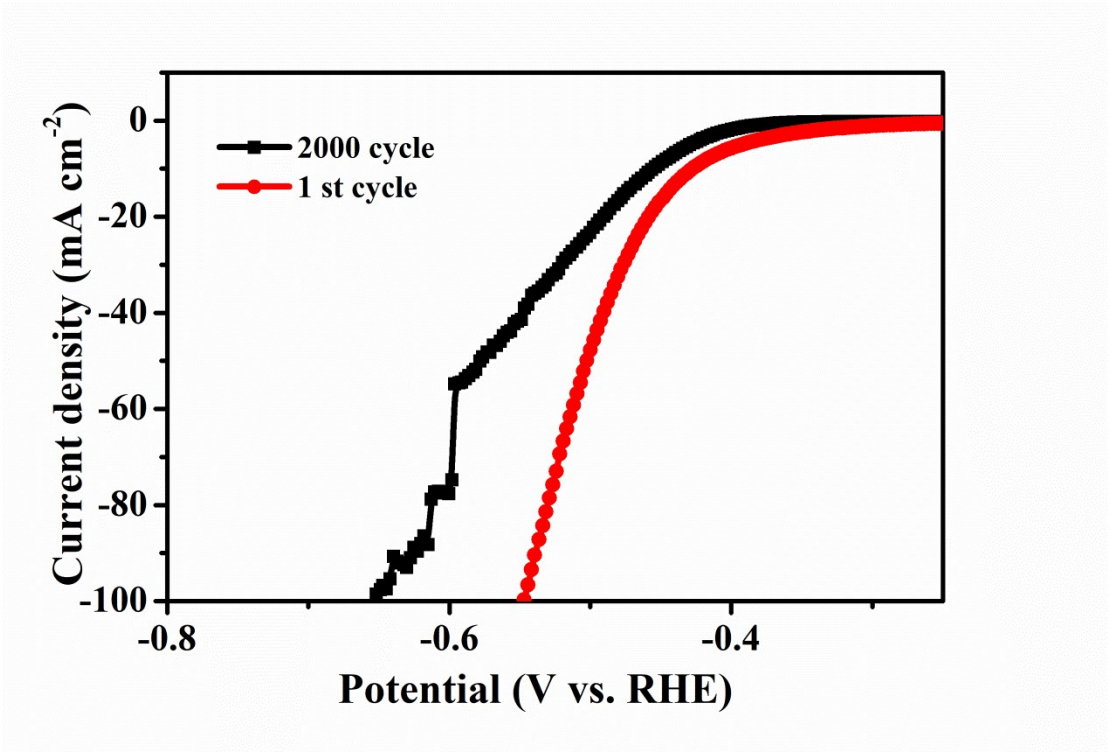

Fig. S6 (a) LSV curves of the Bi_2Te_3/Ti catalyst before and after 2000 CV cycles.