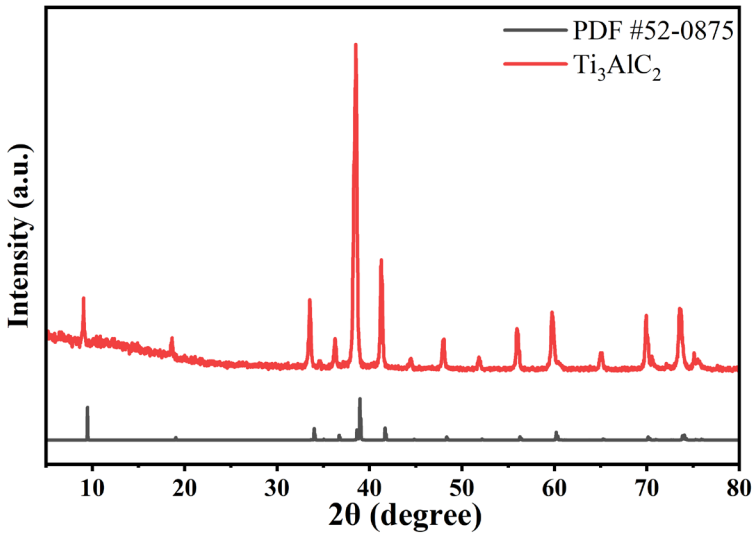

Figure S1. The XRD patterns of Ti_3AlC_2.

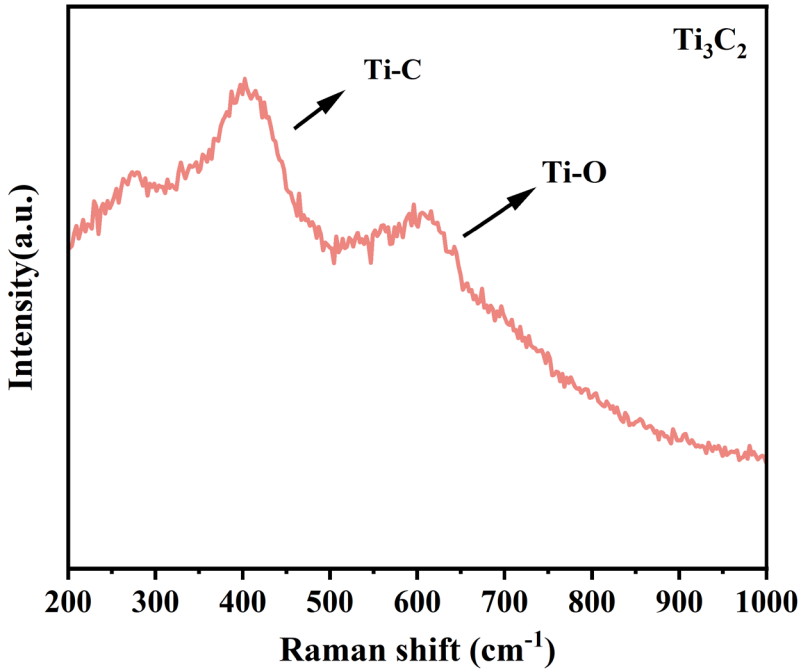

Figure S2. Raman spectrum of Ti_3C_2.

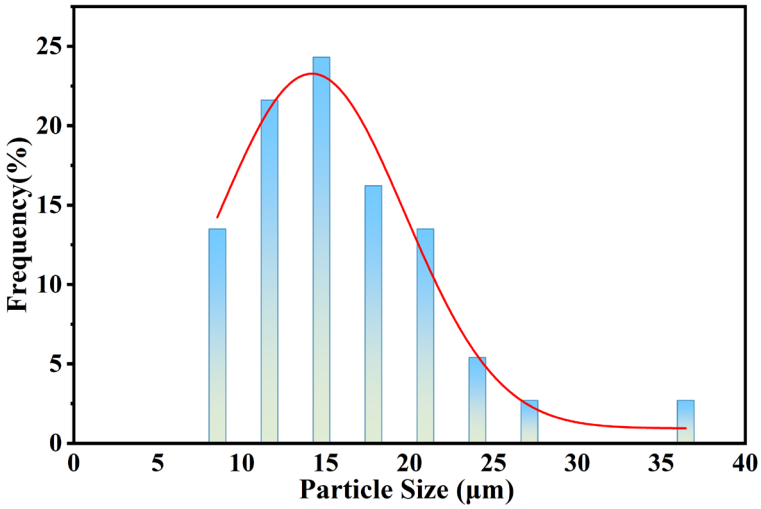

Figure S3. Particle size analysis spectrum of Ti_3C_2.

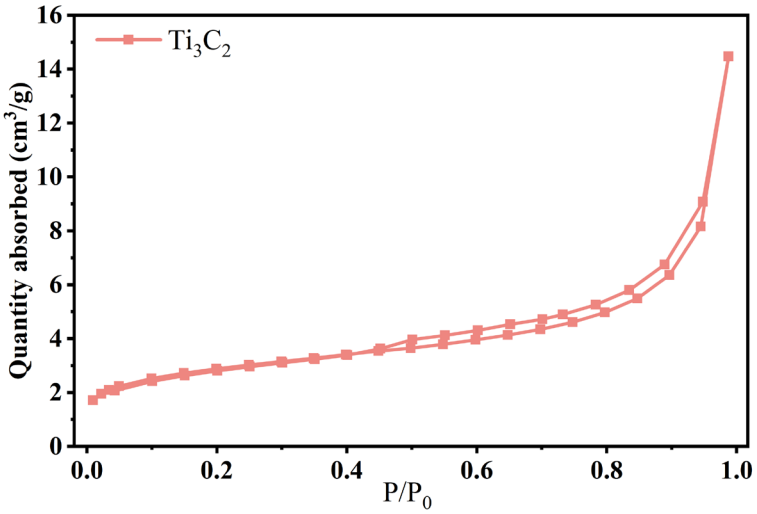

Figure S4. BET analysis of Ti_3C_2.

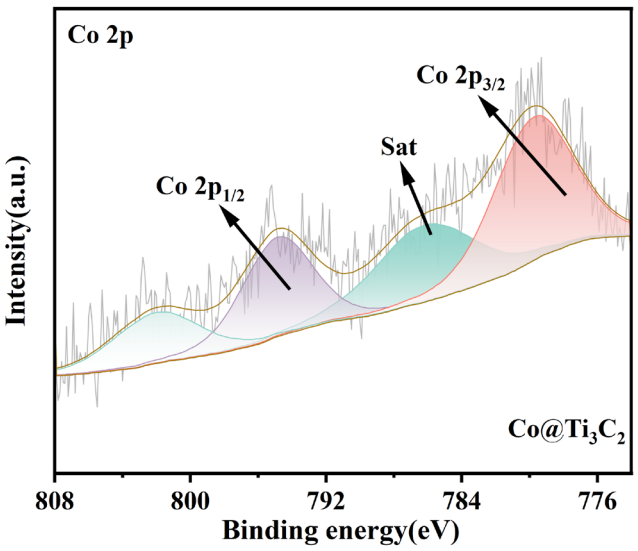

Figure S5. Co 2p XPS spectrum of $Co@Ti_3C_2$.

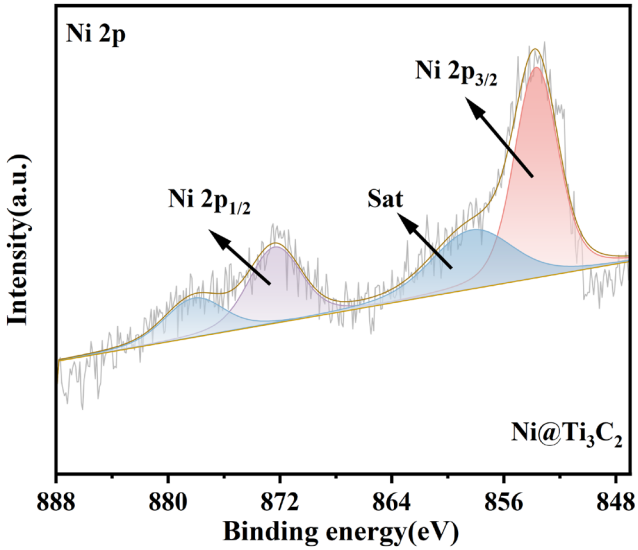

Figure S6. Ni 2p XPS spectrum of $Ni@Ti_3C_2$.

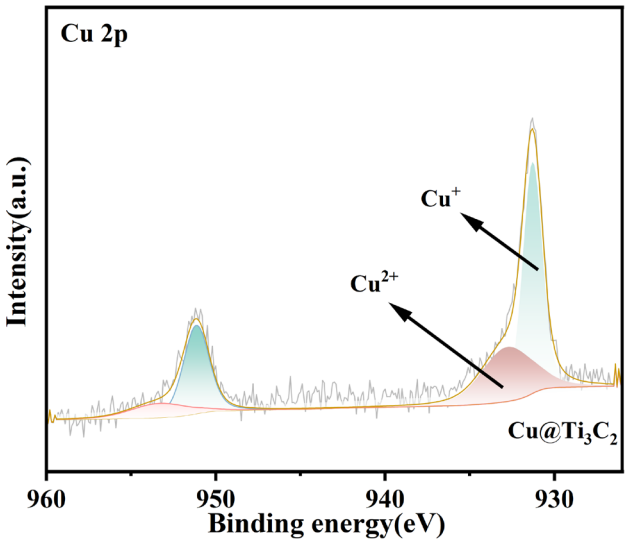

Figure S7. Cu 2p XPS spectrum of $Cu@Ti_3C_2$.

Table S1. Surface atomic and weight ratios of catalysts that are determined by TEM.

Element	Wt%	At%
Ti	80.39%	51.87%
Fe	1.16%	0.64%
C	18.45%	47.48
Total Quantity	100%	100%

Table S2. Comparison of HER performance of $Fe@Ti_3C_2$ with other reported pH universal electrocatalysts.

Catalysts	Electrolytes	Application	Overpotential η_{10} (mV)	Tafel slope (mV dec^{-1})	Reference
Ti_2CT_x	0.5 M H_2SO_4	HER	609	124	32
Mo_2CT_x	0.5 M H_2SO_4	HER	283	82	32
$Nb_4C_3T_x$	1 M KOH	HER	398	122.2	33
$V_4C_3T_x$	0.5 M H_2SO_4	HER	>700	236	34
$Ti_3C_2T_x$ nanofibers	0.5 M H_2SO_4	HER	169	97	35
$CoSe/(CNT)_3$-$(MX)_7$	0.5 M H_2SO_4	HER	174	64	36
$Pt/Ti_3C_2T_x$-550	0.5 M H_2SO_4	HER	32.7	32.3	37
$Ti_3C_2T_x$ @0.1Pt	0.5 M H_2SO_4	HER	43	80	38
Ni–Mo2TiC2Tx	1 M KOH	HER	153.9	108.7	39

N-$Ti_3C_2T_x$	0.5 M H_2SO_4	HER	198	92	40
PPy-PMo_{12}/Ti_3C_2	0.5 M H_2SO_4	HER	172	56.2	41
RuCo-PDC@MXene	1 M KOH	HER	36.1	70.2	42
ALD-Ir/V-MXene	0.5 M H_2SO_4	HER	91	102	43
RuO_2-Ti_3C_2/NF	1 M KOH	HER	20	45.8	44
N,S-Ti_3C_2 QDs/Ru	0.5 M H_2SO_4	HER	28	22.4	45
CoNi-$Ti_3C_2T_x$	1 M KOH	HER	31	33	46
CoNi-$Ti_3C_2T_x$	1 M KOH	HER	90	79.8	46
$Pt_{SA}/Ti_3C_2T_x$	0.5 M H_2SO_4	HER	38	45	47
Fe@Ti_3C_2	**1 M KOH**	**HER**	**81**	**33.03**	**This work**