Supplementary Information (SI) for Journal of Materials Chemistry C.

Efficient organic-inorganic heterojunction structure for enhancing the photocatalytic activity of SubPc /$Ti_3C_2T_x$ towards hydrogen production

Xiaoying Yu,[a,b,c] Tianfang Zheng,[b] Yuanlin Li,[b] Yanxiang Liu,[b] Ping Guo,*[a,c] Hai-Hua Wang,*[b] Shin-ichi Sasaki,*[d] and Xiao-Feng Wang,*[b]

[a]*Key Laboratory of Groundwater Resources and Environment Ministry of Education, College of New Energy and Environment, Jilin University, Changchun 130012, P. R. China*

[b]*Key Laboratory of Physics and Technology for Advanced Batteries (Ministry of Education), College of Physics, Jilin University, Changchun 130012, P. R. China*

[c] *Jilin Provincial Key Laboratory of Water Resources and Environment, Jilin University, Changchun 130012, P. R. China*

[d] *Faculty of Bioscience, Nagahama Institute of Bio-Science and Technology, Nagahama, Shiga 526-0829, Japan*

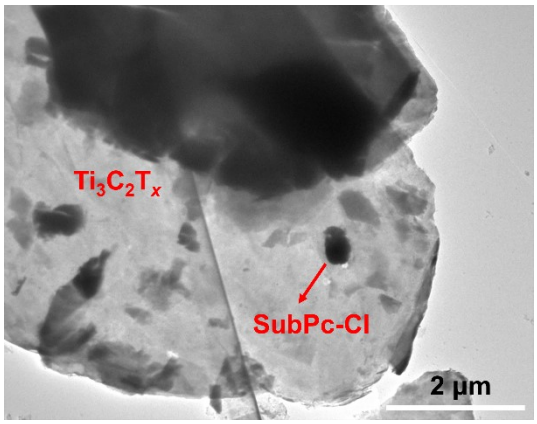

Fig.S1 The TEM image of the SubPc-Cl/$Ti_3C_2T_x$ heterojunction

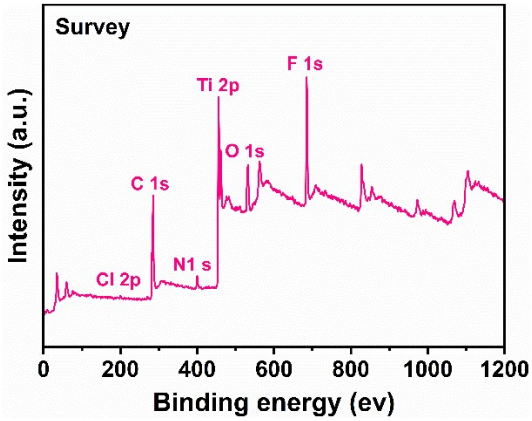

Fig.S2 XPS survey spectra of SubPc-Cl/$Ti_3C_2T_x$

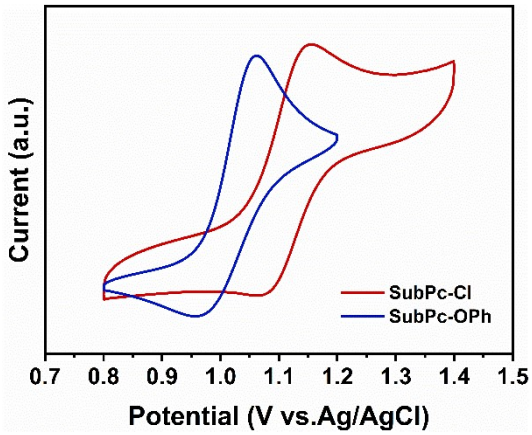

Fig.S3 CVs of SubPc-Cl and SubPc-OPh in CH_2Cl_2 with 0.1 M $TBAPF_6$ as a supporting electrolyte at a scan rate of 100 mV/s (vs. Ag/AgCl).

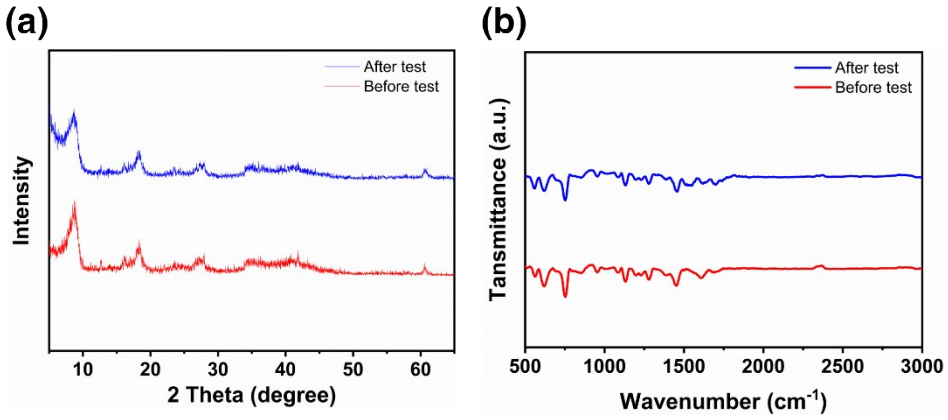

Fig.S4 The XRD and FT-IR spectra of the 2% SubPc-Cl/$Ti_3C_2T_x$ before and after the cycling experiments

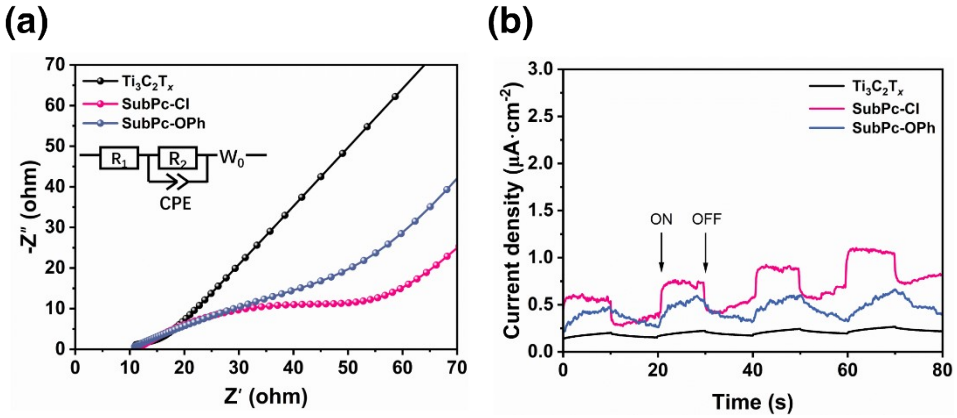

Fig.S5 The EIS Nyquist plots and TPC responses of pure SubPc (SubPc-Cl and SubPc-OPh) and $Ti_3C_2T_x$ samples

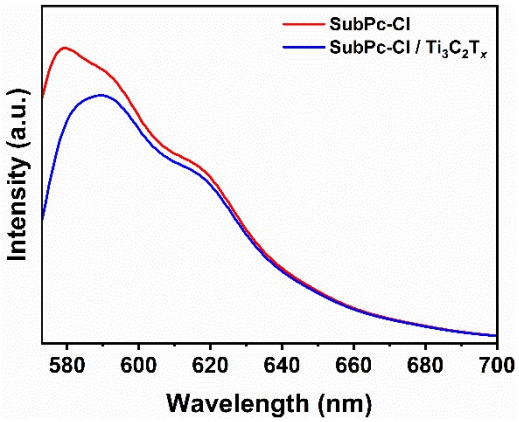

Fig.S6 The PL spectra of SubPc-Cl and SubPc-Cl/$Ti_3C_2T_x$

Table S1. Comparison of Dye@MXene photocatalysts for hydrogen production

Photocatalyst	Light-source	Sacrificial reagent	H_2 production (μmol g^{-1} h^{-1})	Rrf.
SubPc/$Ti_3C_2T_x$	350 W Xenon lamp	AA	105.0	This work
Car@$Ti_3C_2T_x$	350 W Xenon lamp	AA	84.4	1
SQ@$Ti_3C_2T_x$	350 W Xenon lamp	AA	28.6	2
BChl@$Ti_3C_2T_x$	350 W Xenon lamp	AA	51.0	3
Chl@$Ti_3C_2T_x$	350 W Xenon lamp	AA	52±5	4

Table S2. H_2 production (μmol g^{-1} h^{-1})

Mass ratio with $Ti_3C_2T_x$ (%)	SubPc-Cl	SubPc-Oph
0.5	50.0	23.0
2	105.0	92.0
4	80.0	56.0

8	41.0	33.0

Table S3. Cycling test results of SubPc-Cl/$Ti_3C_2T_x$ photocatalyst

	H_2 production of 2% SubPc-Cl/$Ti_3C_2T_x$
Run1	419.84
Run2	402.33
Run3	380.62
Run4	350.81
Run5	340.14

Reference

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