Electronic Supplementary Material (ESI) for Materials Chemistry Frontiers.

Noncovalent functionalization of $Ti_3C_2T_X$ using cationic porphyrins with enhanced stability against oxidation

*Shameel Thurakkal and Xiaoyan Zhang**

Dr. Shameel Thurakkal, Prof. Xiaoyan Zhang
Division of Chemistry and Biochemistry, Department of Chemistry and Chemical Engineering, Chalmers University of Technology, Kemigården 4, SE-412 96 Göteborg, Sweden
E-mail: xiaoyan.zhang@chalmers.se

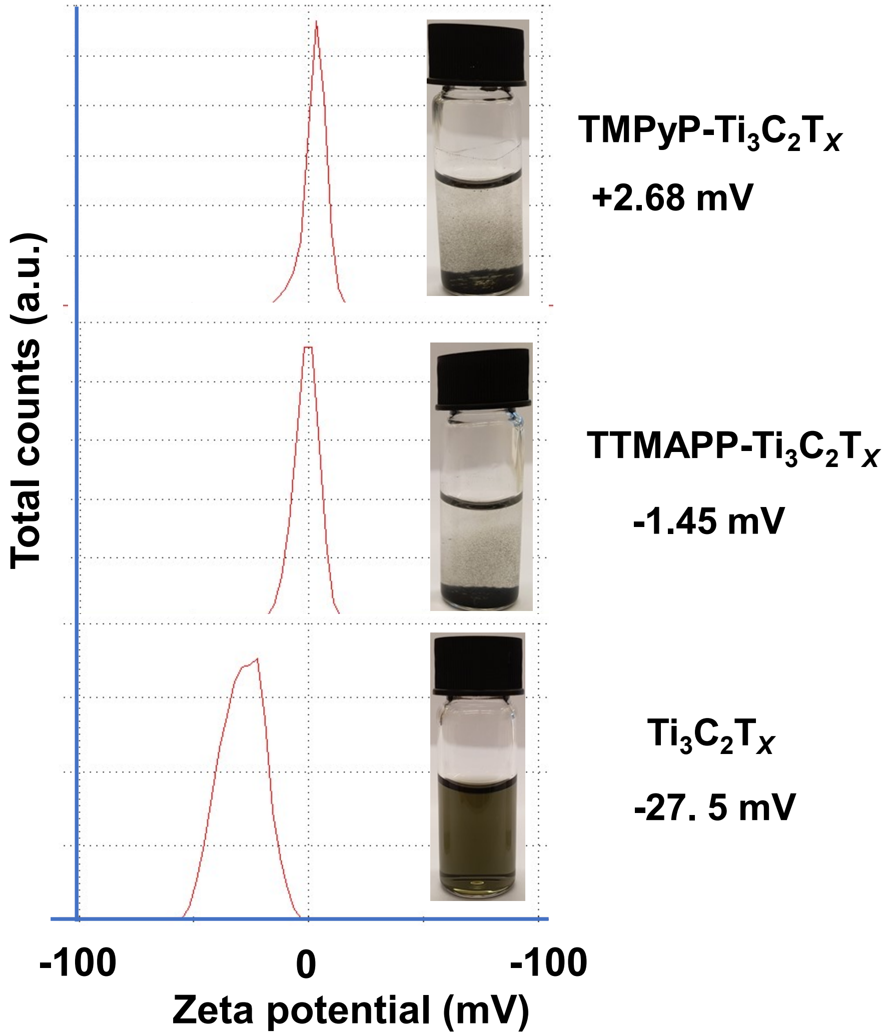

Fig. S1. Zetapotential and dispersions (inset images) of the $Ti_3C_2T_X$, TMPyP- $Ti_3C_2T_X$ and TTMAPP- $Ti_3C_2T_X$ in water. The zetapotential measurements for the two hybrids were carried out by adding 1 µmol of the porphyrins into 10 µg of the $Ti_3C_2T_X$ in water.

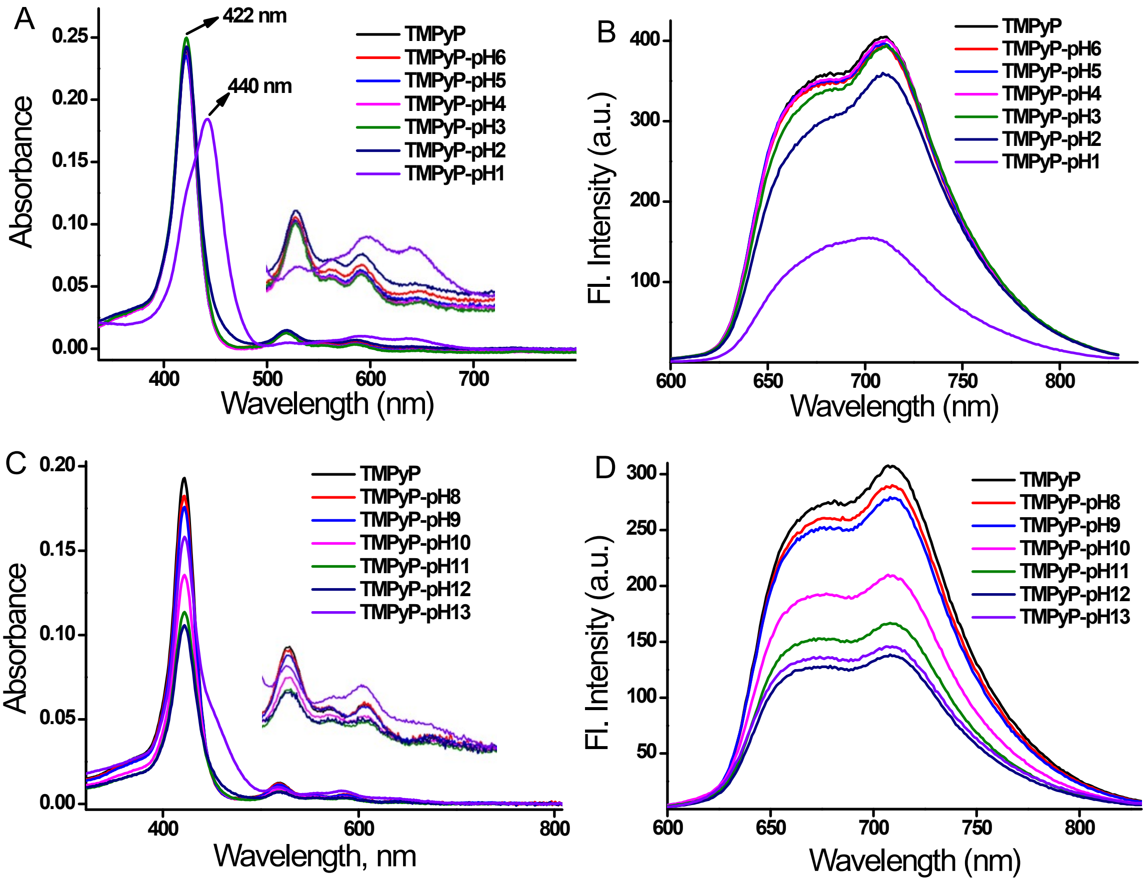

Fig. S2. UV-visible absorption and fluoresence emission spectra of 1 μM of the TMPyP under acidic (A and B) and basic (C and D) conditions in water, respectively. The inset images (A and C) show the enlarged Q bands of the TMPyP under acidic and basic conditions.

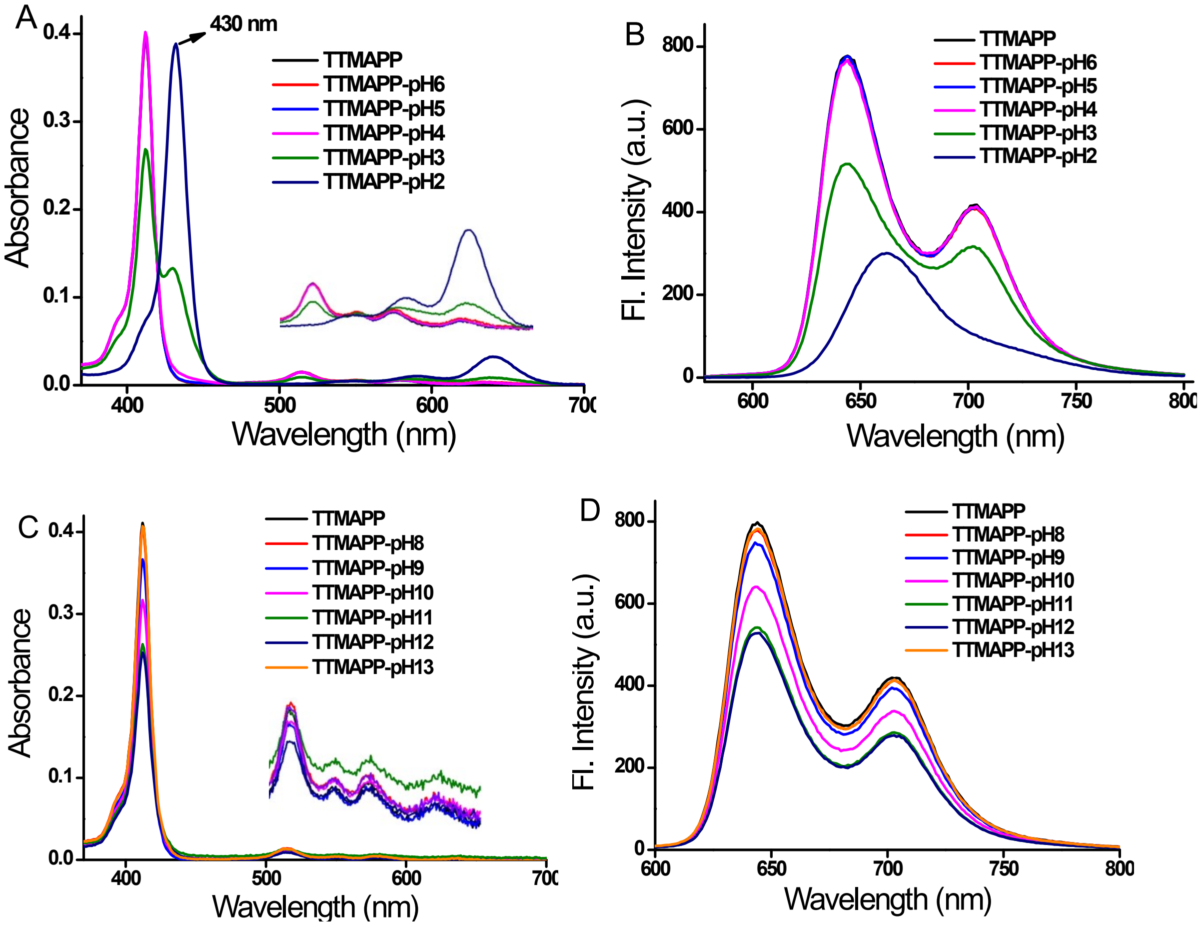

Fig. S3. UV-visible absorption and fluorescence emission spectra of 1 μM of the TTMAPP under acidic (A and B) and basic (C and D) conditions in water. The inset images (A and C) show the enlarged Q bands of the TTMAPP under acidic and basic conditions.

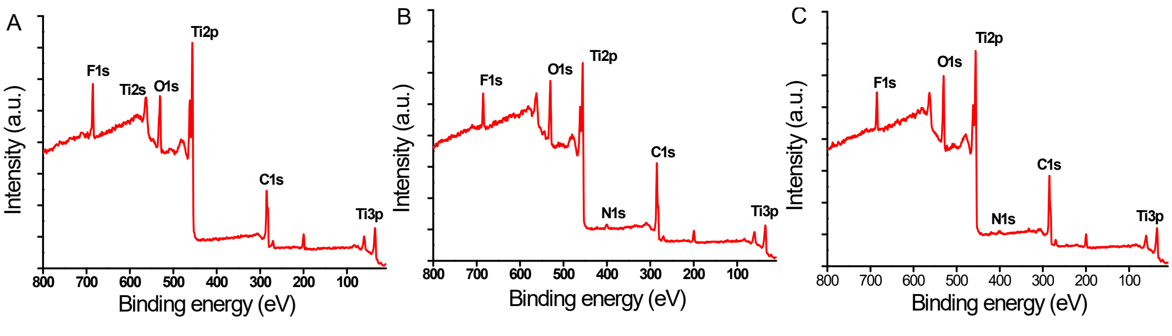

Fig. S4. XPS survey spectra of the$Ti_3C_2T_X$ (A), TMPyP- $Ti_3C_2T_X$ (B) and TTMAPP- $Ti_3C_2T_X$ (C).

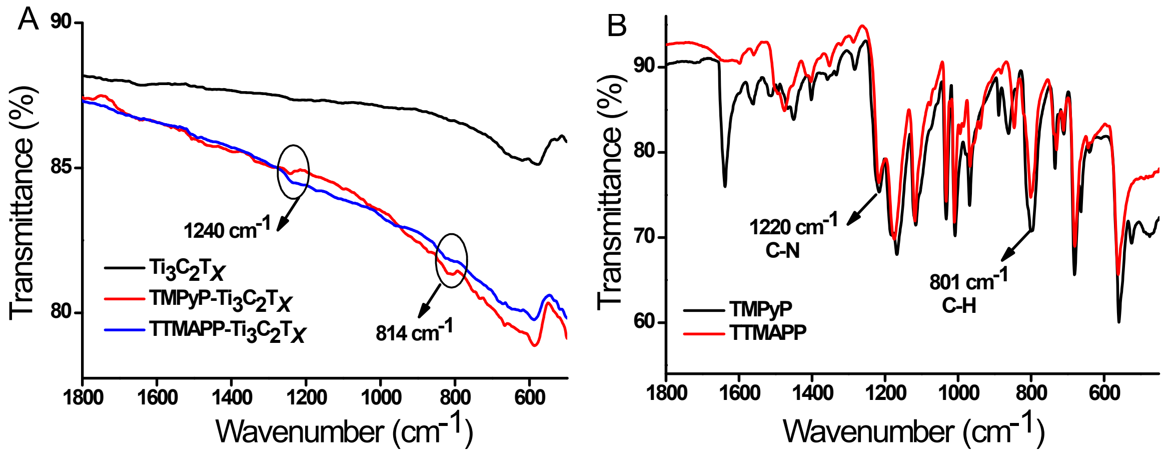

Fig. S5. IR spectra of the $Ti_3C_2T_X$, TMPyP-$Ti_3C_2T_X$ and TTMAPP-$Ti_3C_2T_X$ (A) and TMPyP and TTMAPP (B).

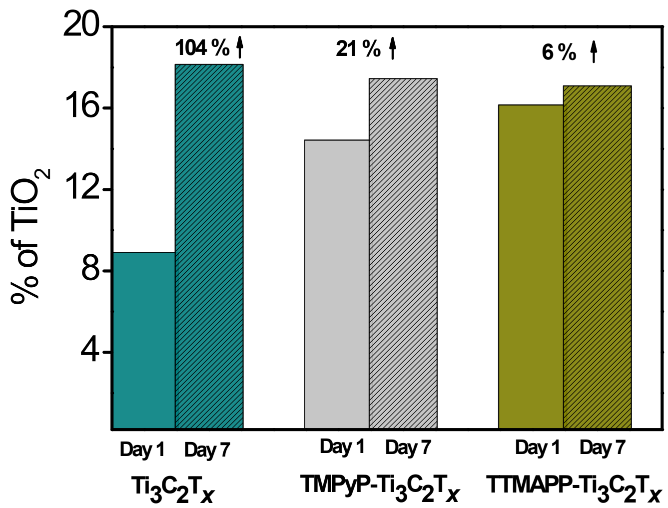

Fig. S6. Comparison of the area (in %) of the TiO_2 peak obtained from the high resolution Ti2p XPS spectra of the $Ti_3C_2T_X$, TMPyP-$Ti_3C_2T_X$ and TTMAPP-$Ti_3C_2T_X$ before and after storing them in undeoxygenated water for one week.

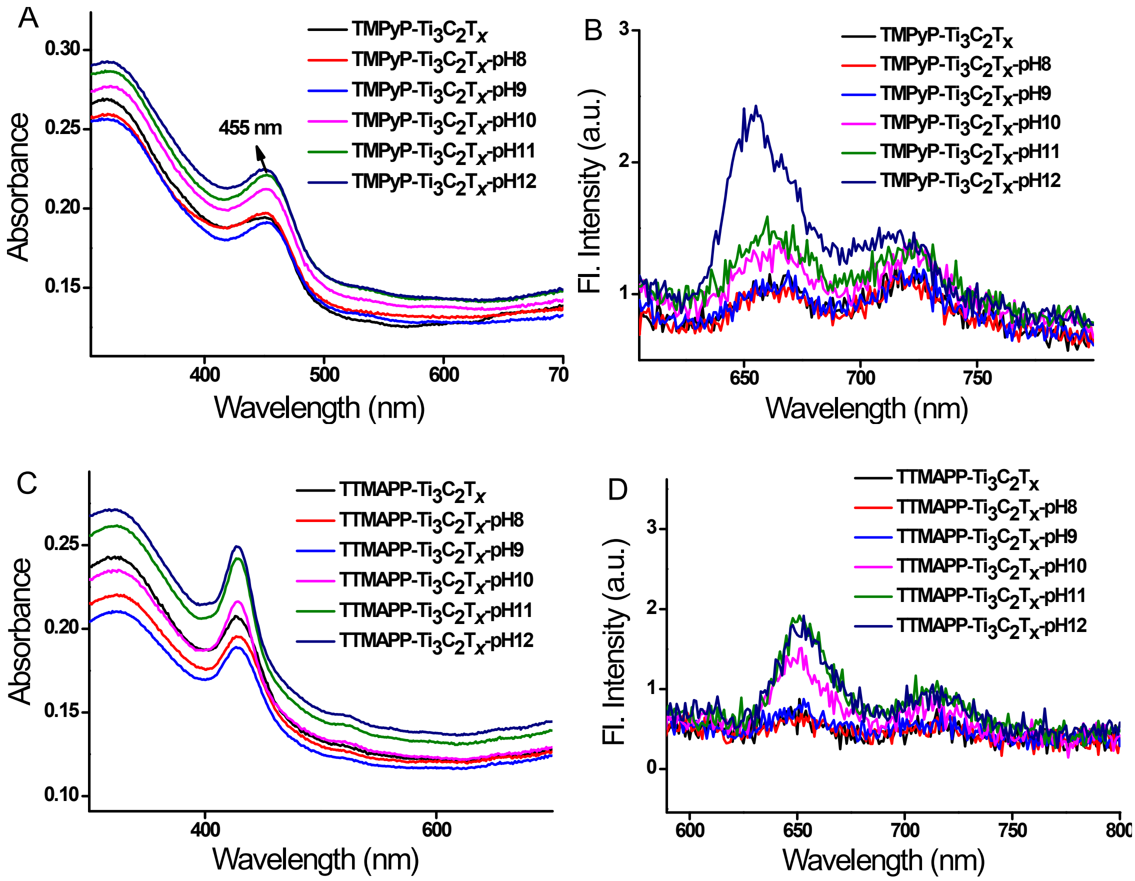

Fig. S7. UV-visible absorption and fluorescence emission spectra of the TMPyP-$Ti_3C_2T_X$ (A and B), TTMAPP-$Ti_3C_2T_X$ (C and D), respectively, under basic conditions in water.