

Supplementary information

Ti₃C₂ MXene improved photoelectrochemical anode assembly of titanium dioxide nanoarrays for microcystin-LR detection

Yue Jia^a, Yu Du^c, Xiaoyue Zhang^a, Rui Xu^a, Xiang Ren^a, Dan Wu^a, Hongmin Ma^a, Qin Wei^{a,b,*}

^aKey Laboratory of Interfacial Reaction & Sensing Analysis in Universities of Shandong, School of Chemistry and Chemical Engineering, University of Jinan, Jinan 250022, P. R. China

^bDepartment of Chemistry, Sungkyunkwan University, Suwon 16419, Republic of Korea.

^cCollaborative Innovation Center for Green Chemical Manufacturing and Accurate Detection, University of Jinan, Jinan 250022, P. R. China.

***Corresponding Author**

E-mail: sdjndxwq@163.com (Qin Wei)

Table of Contents

UV-VIS-NIR absorption of TiO_2 and $\text{TiO}_2/\text{Ti}_3\text{C}_2$	3
EDS line scan of $\text{TiO}_2/\text{Ti}_3\text{C}_2$	4
Band gap and valence band spectra of rutile TiO_2	5
Simulation parameters of the equivalent circuit components.....	6
Specificity tests of sensors.....	7

UV-VIS-NIR absorption of TiO_2 and $\text{TiO}_2/\text{Ti}_3\text{C}_2$

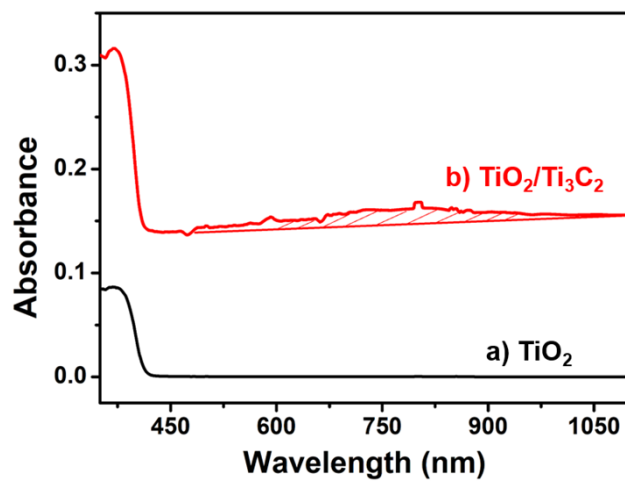


Fig. S1. UV-VIS-NIR absorption of TiO_2 and $\text{TiO}_2/\text{Ti}_3\text{C}_2$.

EDS line scan of $\text{TiO}_2/\text{Ti}_3\text{C}_2$

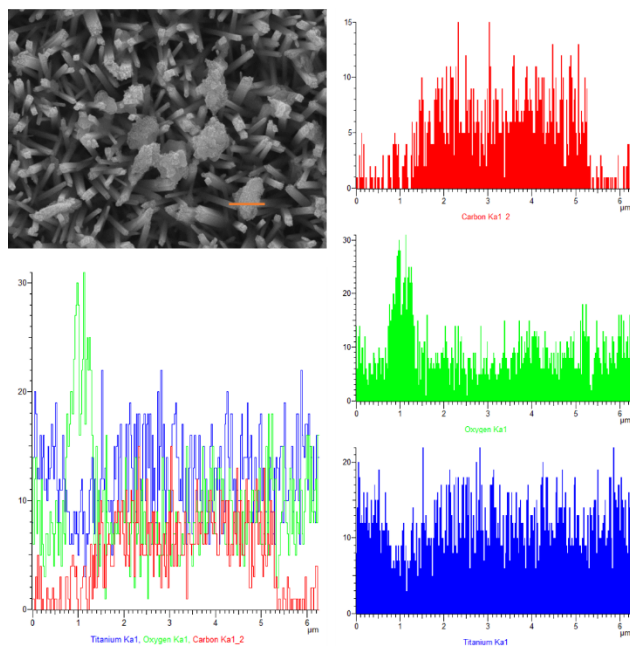


Fig. S2. EDS line scan of $\text{TiO}_2/\text{Ti}_3\text{C}_2$.

Band gap and valence band spectra of rutile TiO_2

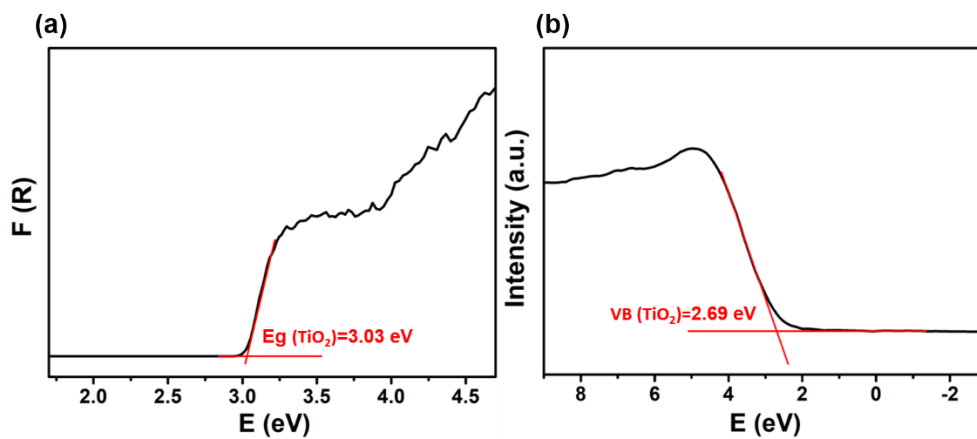


Fig. S3. (a) Band gap and (b) valence band spectra of rutile TiO_2 .

Simulation parameters of the equivalent circuit components

Table S1 Simulation parameters of the equivalent circuit components

Electrode modification	R_s (ohm)	R_{et} (ohm)	C_{dl} (F)	Z_w
FTO	188.1	1740	2.608×10^{-5}	0.0009907
FTO/TiO ₂	74.15	2992	1.03×10^{-5}	0.008969
FTO/TiO ₂ /Ti ₃ C ₂	55.23	1695	1.573×10^{-5}	0.00785
FTO/TiO ₂ /Ti ₃ C ₂ /aptamer	43.39	1983	1.46×10^{-5}	0.005299
FTO/TiO ₂ /Ti ₃ C ₂ /aptamer/MC-LR	55.72	2832	1.129×10^{-5}	0.009516

Specificity tests of sensors.

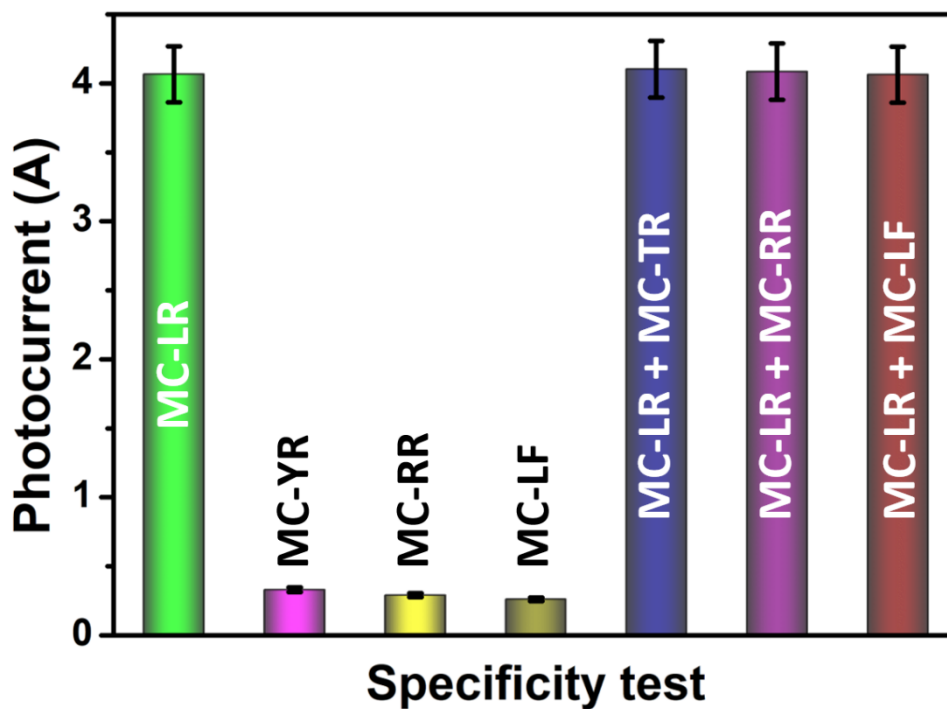


Fig. S4. The specificity tests of sensors using 0.1 ng/mL of MC-YR, MC-RR and MC-LF as targets mixed with 0.1 ng/mL of MC-LR.