Electronic Supplementary Material (ESI) for Analytical Methods.
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Supporting Information (SI)

Reasonable design of MXene-based enzyme-free amperometric sensing interface for highly sensitive hydrogen peroxide detection

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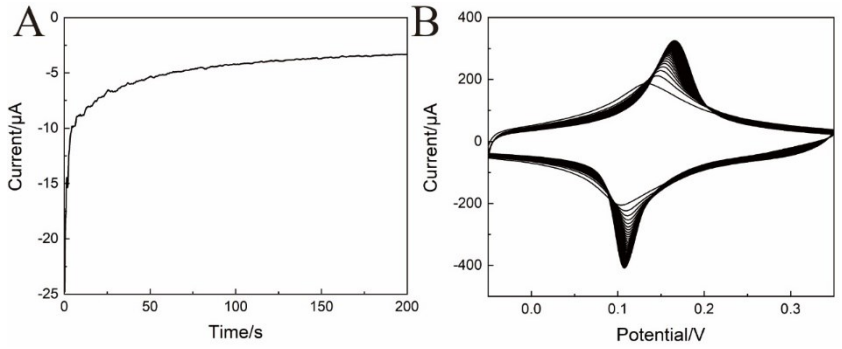

Figure S1. (A) I-t curve of electrodeposited Prussian blue in an aqueous electrolyte containing 2.5 mM $FeCl_3$, 2.5 mM $K_3Fe(CN)_6$, 0.1 M KCl and 0.01 M HCl. (B) CV curves of Prussian blue activated in 0.01 M HCl contain 0.1 M KCl. Scan rate: 50 mV s^{-1}.

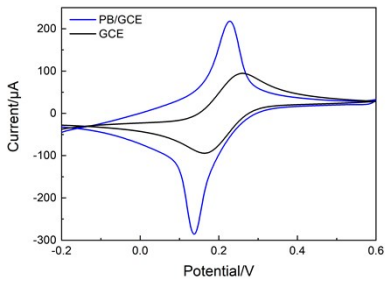

Figure S2. CVs of bare GCE (black) and PB/GCE (blue) in 5 mM $[Fe(CN)_6]^{3-/4-}$ containing 0.1 M KCl. Scan rate: 50 mV s^{-1}.

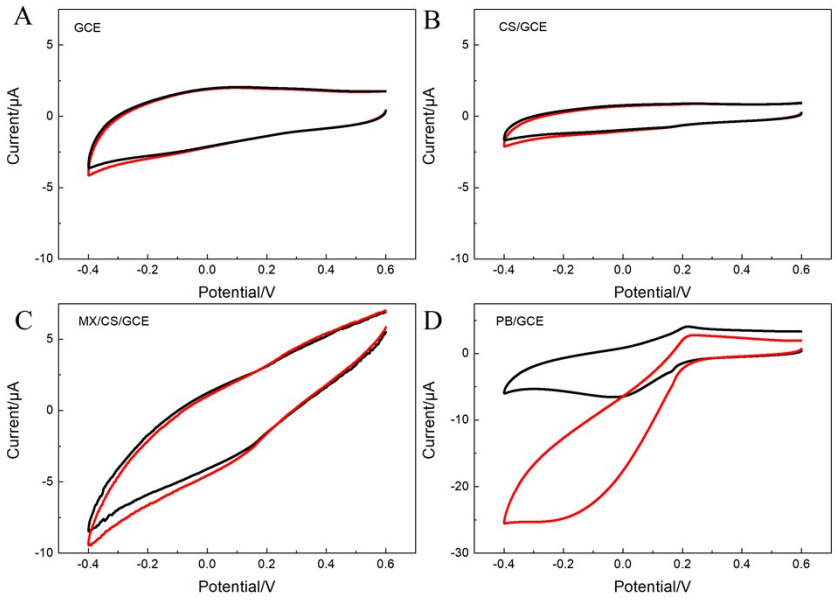

Figure S3. CVs of GCE (A), CS/GCE (B), MX/CS/GCE (C) and PB/GCE (D) in the absence (black) and presence (red) of 5 mM H_2O_2 in 0.1 M phosphate buffer (pH 6.0).

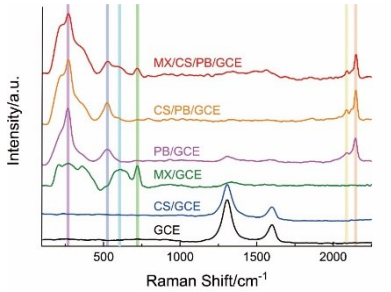

Figure S4. Raman spectra from GCE, CS/GCE, MX/GCE, PB/GCE, CS/PB/GCE and MX/CS/PB/GCE. Excitation wavelength is 765 nm (300 mW).

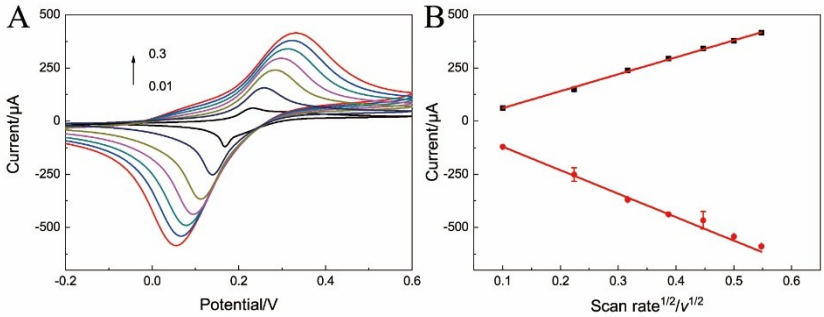

Figure S5. (A) CVs of MX/CS/PB/GCE in 5 mM $[Fe(CN)_6]^{3-/4-}$ containing 0.1 M KCl with different scan rates: 10 mV s^{-1}, 50 mV s^{-1},100 mV s^{-1}, 150 mV s^{-1}, 200 mV s^{-1}, 250 mV s^{-1} , 300 mV s^{-1} (from inner to outer), respectively. (B) Plot of peak currents versus the square root of scan rates ($v^{1/2}$).

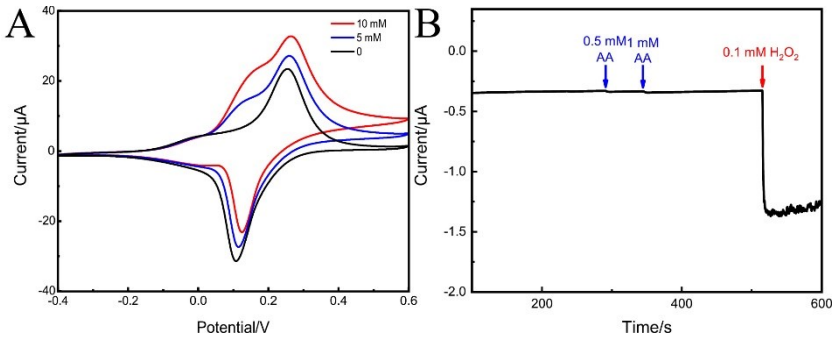

Figure S6. (A) CVs of MX/CS/PB/GCE in 0.1 M phosphate buffer (pH 6.0) with different concentrations of AA. Scan rate: 100 mV s^{-1}. (B) Amperometric response of MX/CS/PB/GCE during continuous injection of AA and H_2O_2. Applied potential: -0.2 V vs Ag/AgCl.

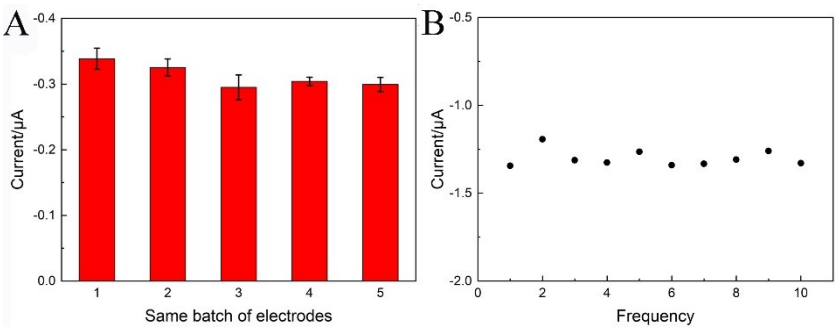

Figure S7. (A) The reproducibility of MX/CS/PB/GCE was obtained in the same batch of different electrodes in 0.1 M phosphate buffer (pH 6.0) containing 20 μM H_2O_2. (B) The stability of MX/CS/PB/GCE was tested ten times continuously in 0.1 M phosphate buffer (pH 6.0) containing 100 μM H_2O_2.

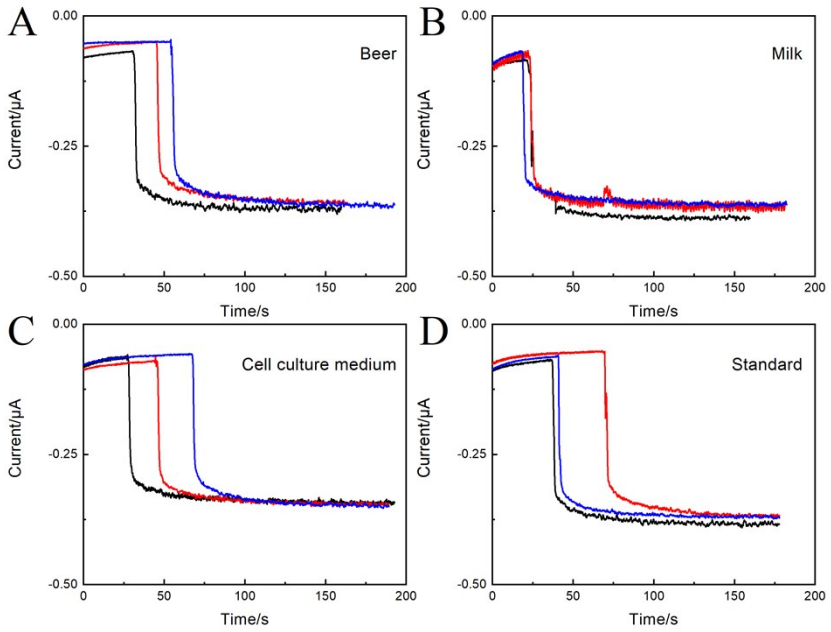

Figure S8. Amperometric response of MX/CS/PB/GCE with different samples (pH 6.0) contain 20 μM H_2O_2 (A-C) and 20 μM H_2O_2 standard solution (D).

Table S1. XPS peak fitting results for MX.

Region	Assigned to	BE/eV	Ref
Ti 2p	Ti-C	455.01	1
	Ti^{2+}	455.76	2
	Ti^{3+}	456.58	2
	Ti-O (TiO_2)	458.39	
C 1s	C-C	284.6	3
	C-Ti	281.58	4
O 1s	TiO_2	530.43	
	C-Ti-O_x	531.55	
	C-Ti-$(OH)_x$	532.71	5
F 1s	C-Ti-F_x	684.43	

Reference

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