Electronic Supplementary Information

For

$Ti_3C_2T_x$ MXene based Flexible Zn-ion Microsupercapacitor with Redox-Active Electrolyte for integrated Pressure Sensing Application

Weijia Liu, La Li*, and Guozhen Shen*

W. Liu, Dr. L. Li, Prof. G. Z. Shen

School of Integrated Circuits and Electronics, Beijing Institute of Technology, Beijing 100081, China, E-mail: lali@bit.edu.cn, gzshen@bit.edu.cn

*Corresponding author:

E-mail address: lali@bit.edu.cn, gzshen@bit.edu.cn

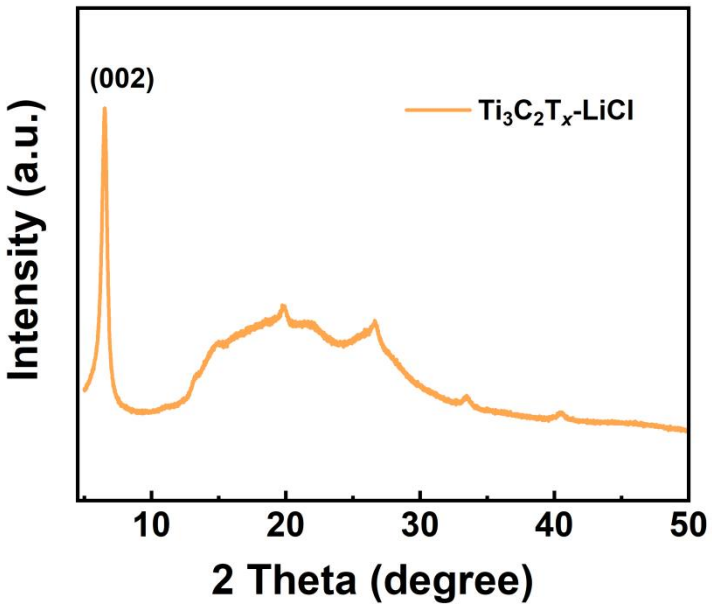

Fig. S1 The XRD patterns of the mono-layer $Ti_3C_2T_x$-LiCl MXene.

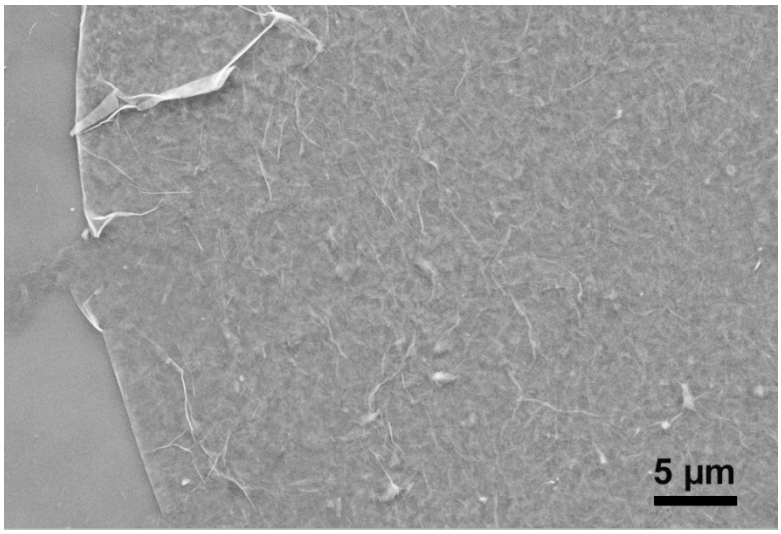

Fig. S2 The SEM image of the mono-layer $Ti_3C_2T_x$-LiCl MXene.

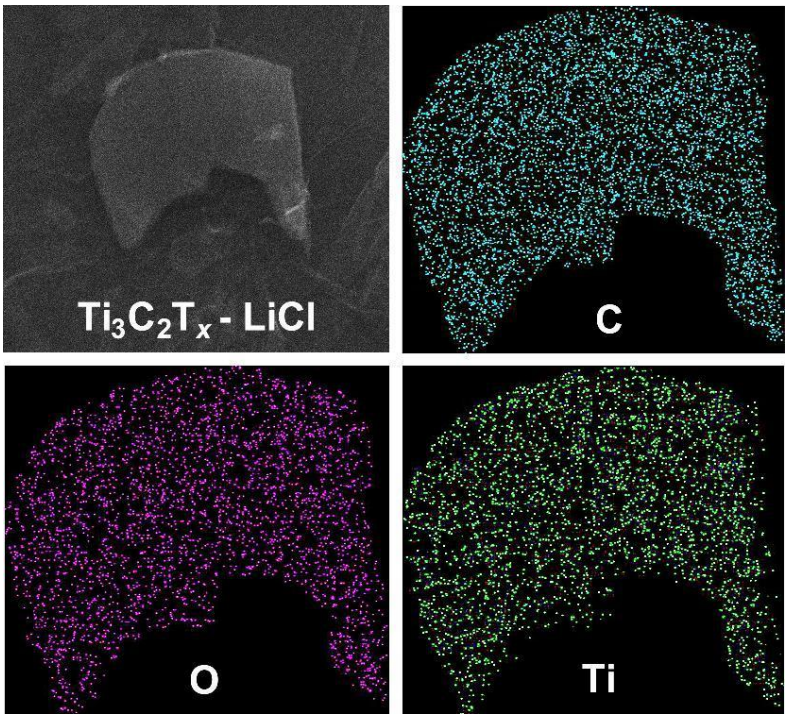

Fig. S3 The SEM image and corresponsing elemental mapping of the single $Ti_3C_2T_x$-LiCl MXene.

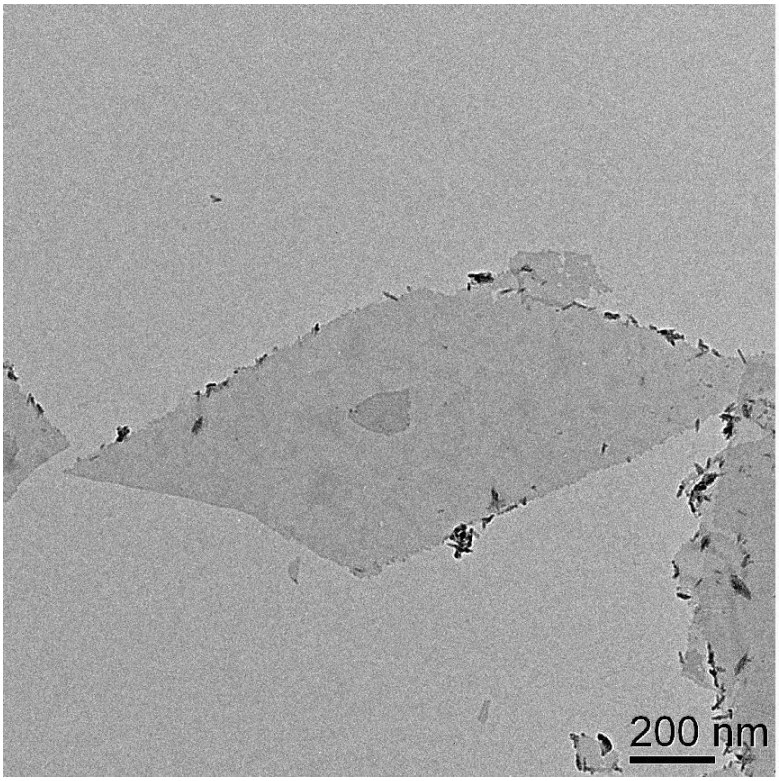

Fig. S4 The TEM image of the single $Ti_3C_2T_x$-DMSO MXene.

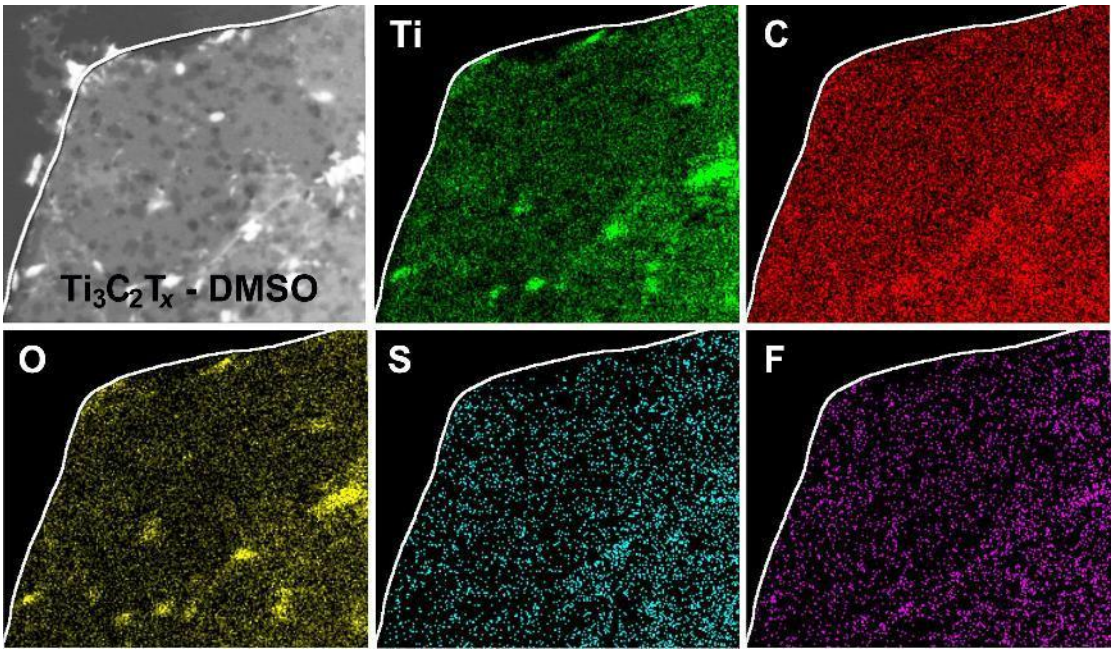

Fig. S5 The TEM image and corresponsing elemental mapping of the single $Ti_3C_2T_x$-LiCl MXene.

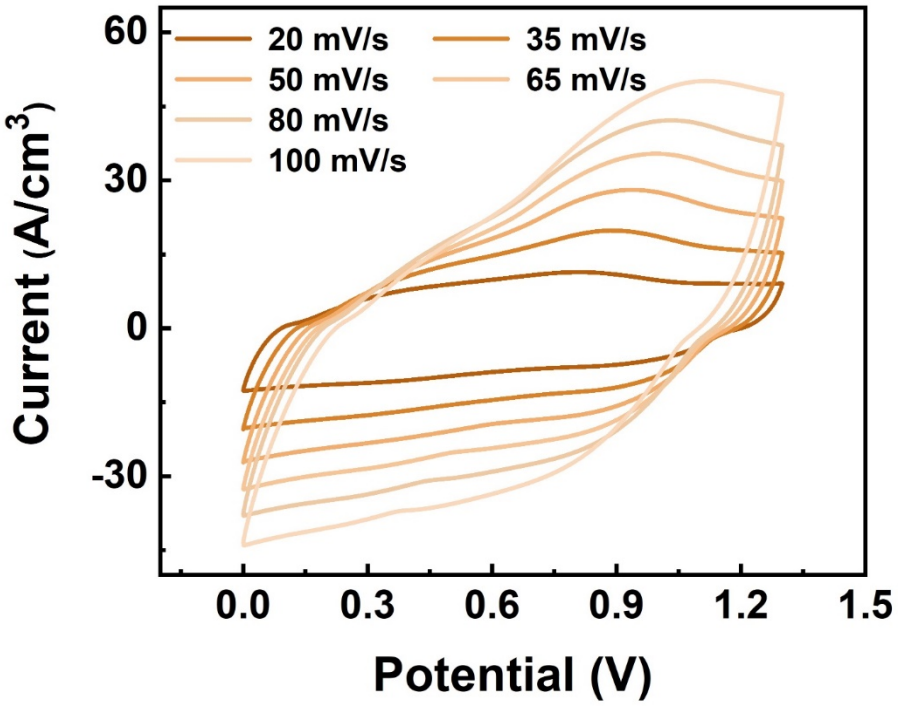

Fig. S6 The CV curves of $Ti_3C_2T_x$-DMSO MXene-based Zn-ion MSC with $K_3Co(CN)_6$ additive.

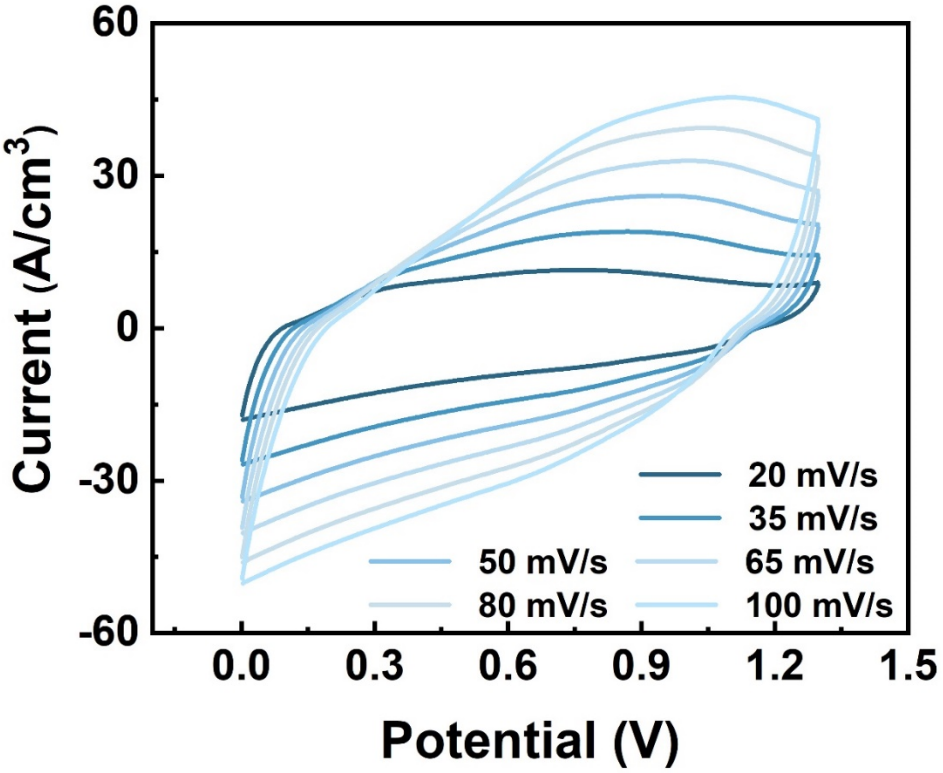

Fig. S7 The CV curves of $Ti_3C_2T_x$-DMSO MXene-based Zn-ion MSC without additive.

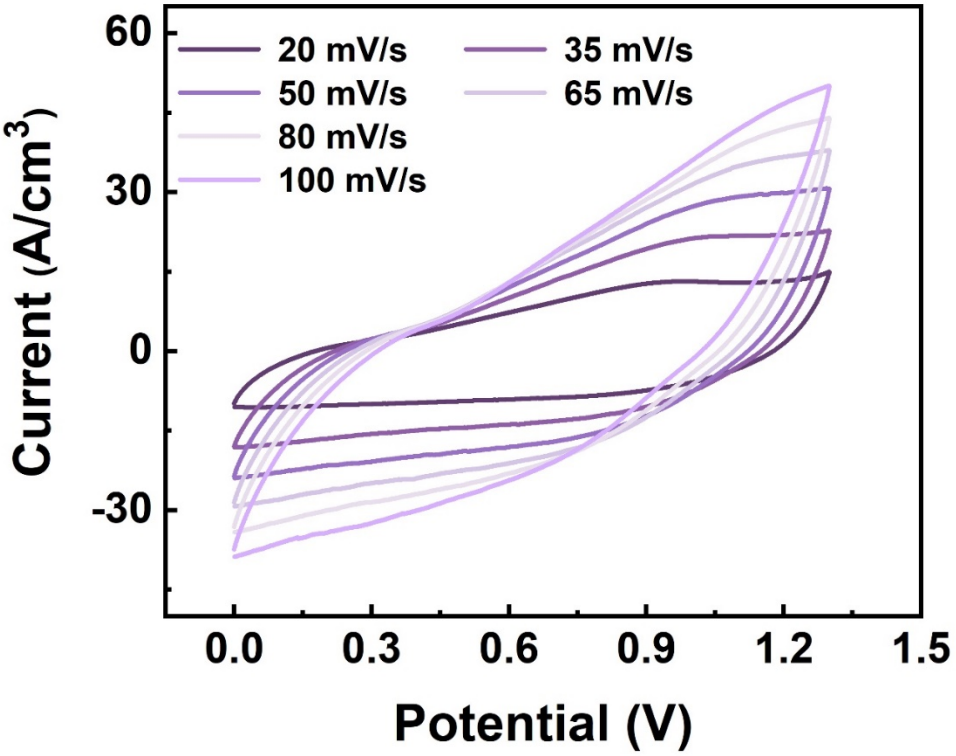

Fig. S8 The CV curves of $Ti_3C_2T_x$-DMSO MXene-based Zn-ion MSC with CKNSe additive.

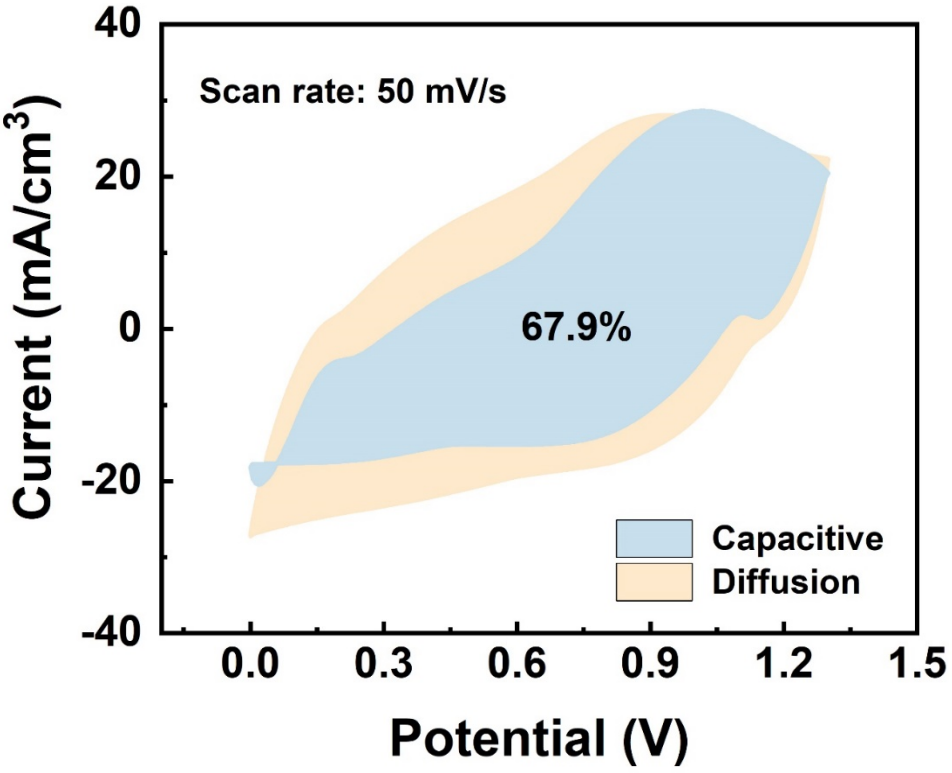

Fig. S9 Capacitive and diffusion current of the $Ti_3C_2T_x$-DMSO cathodes based SC with $K_3Co(CN)_6$ additive at a scan rate of 50 mV/s.

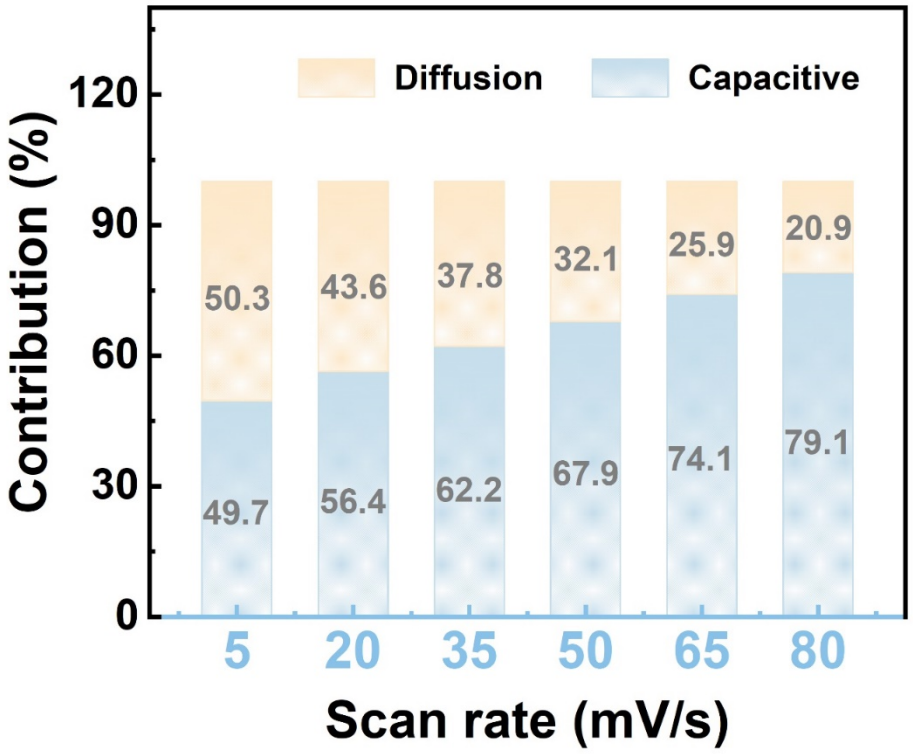

Fig. S10 Capacitive and diffusion contribution ratio of the SC at different scan rates.

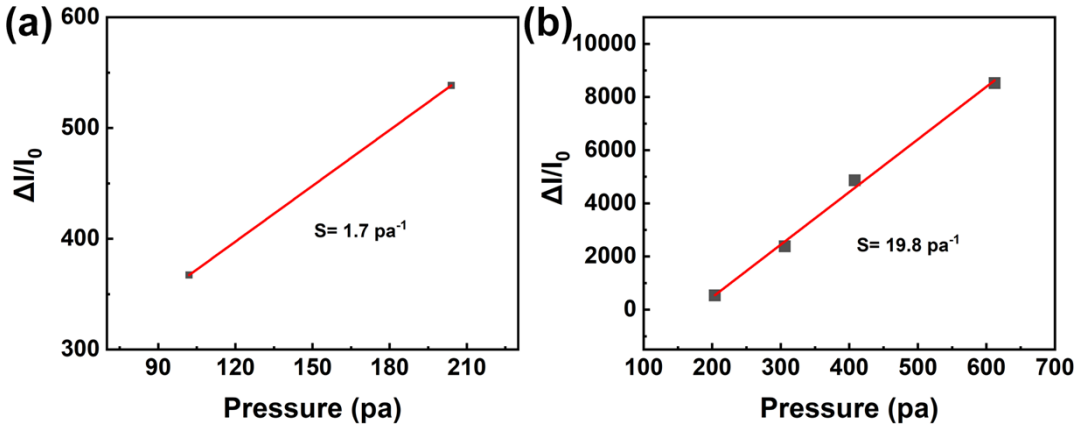

Fig. S11 Sensitivity plots of the flexible sensors under various pressure levels (n = 3 measurements)**.**

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Calculations of the volumetric capacitance/energy density

$\frac{\int_0^v I\,dv}{SVA}$ Volumetric capacitance could be calculated by the equations:

$C_A =$

Where C_A represented the specific volumetric capacitance, I was current, S standed for the scan rate, V was the potential in the CV curve, A was the volume of the devices.

The energy density and power density:

$E = C_A \times \Delta V^2 / 7200$ $P = E \times 3600 / \Delta t$

E represented the energy density, P was the power density, and Δt was the total discharge time.