Supporting Information

Facile CuS Decorated Ti_3C_2 MXene with Enhanced Performance for Asymmetric Supercapacitor

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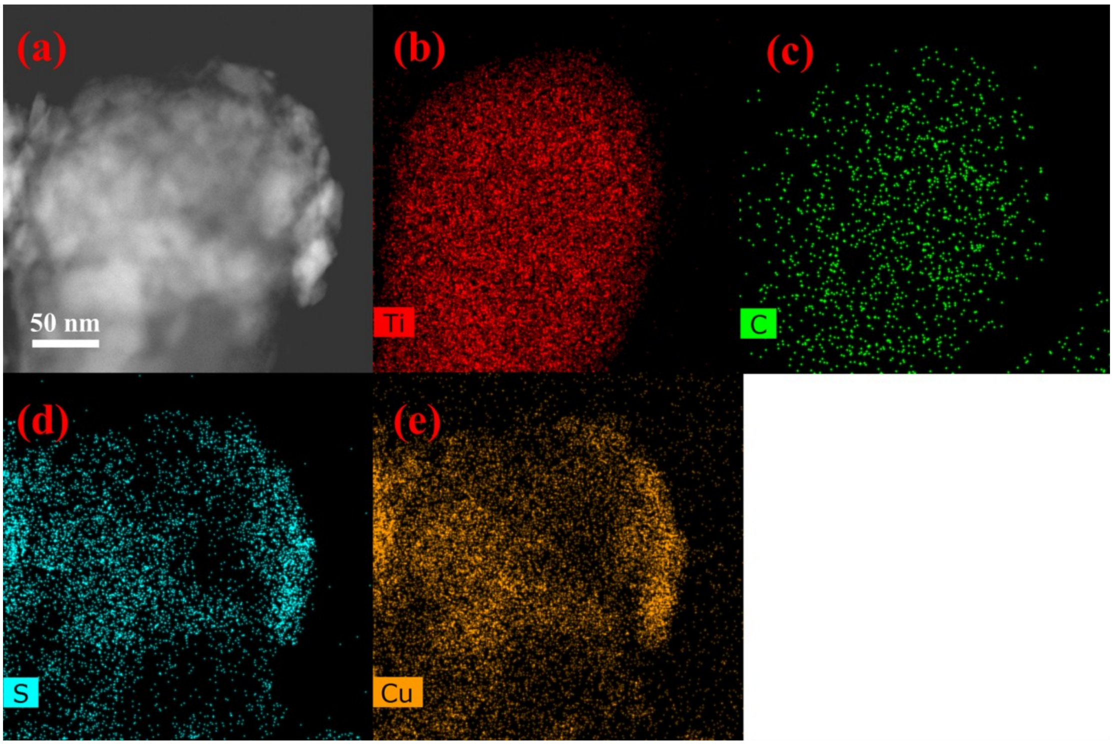


Figure S1. (a) TEM image of TC-9 and elemental mapping images of (b) Ti, (c) C, (d) S and (e) Cu.

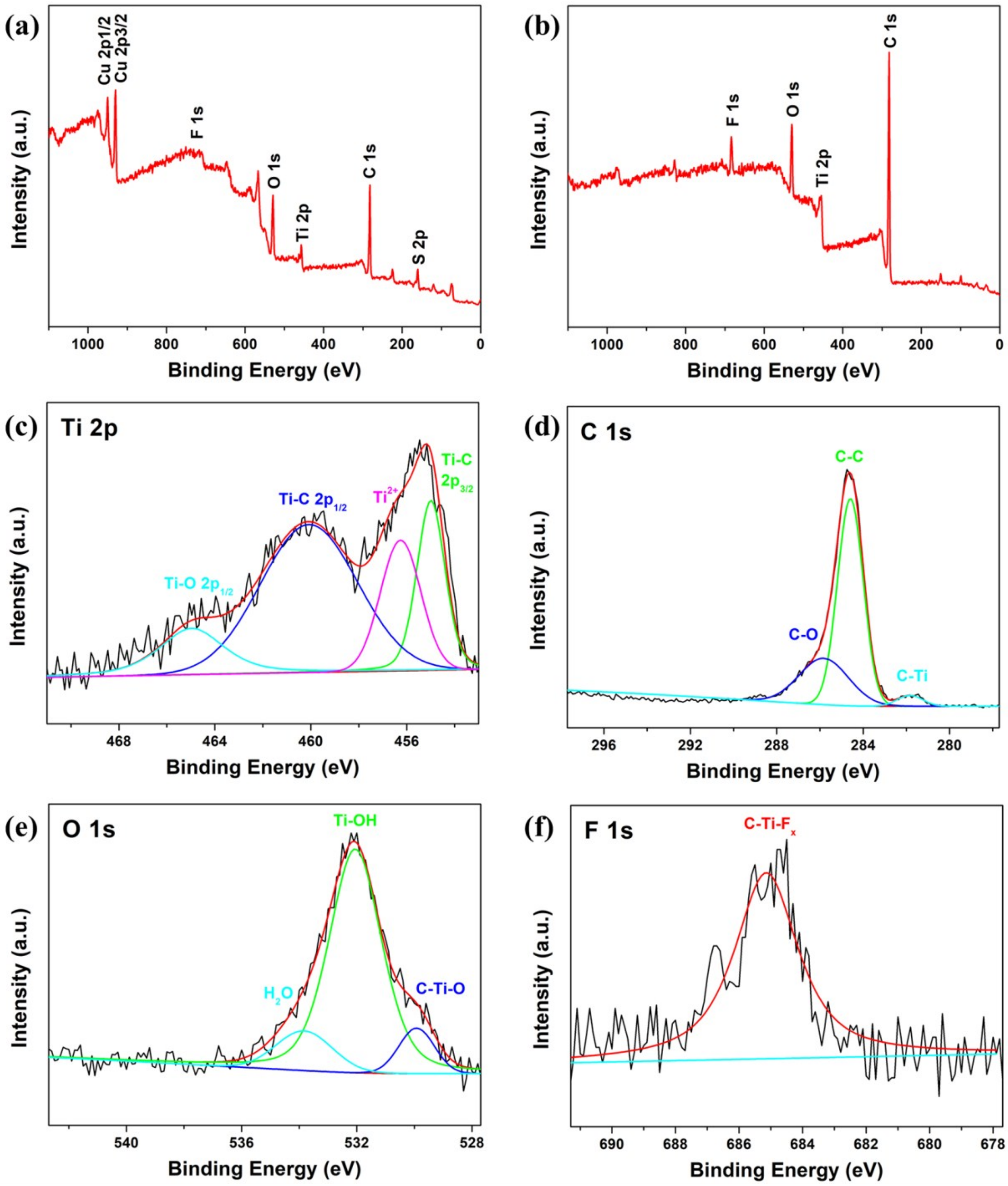
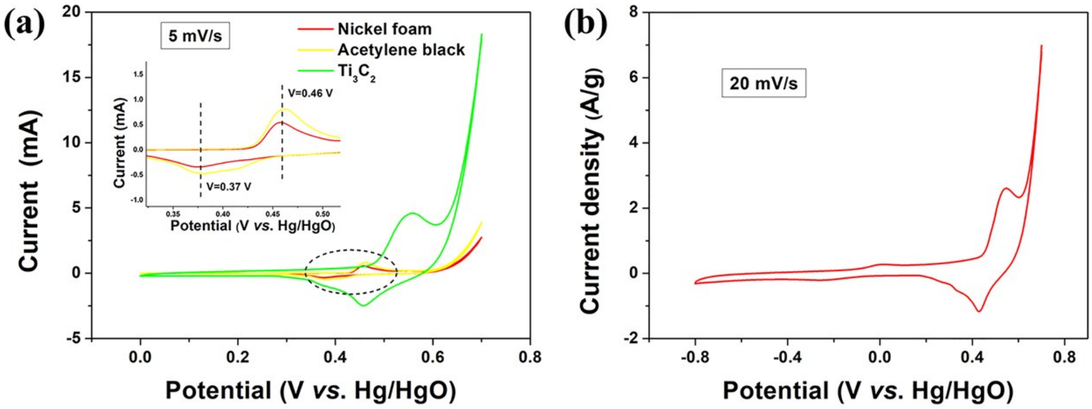
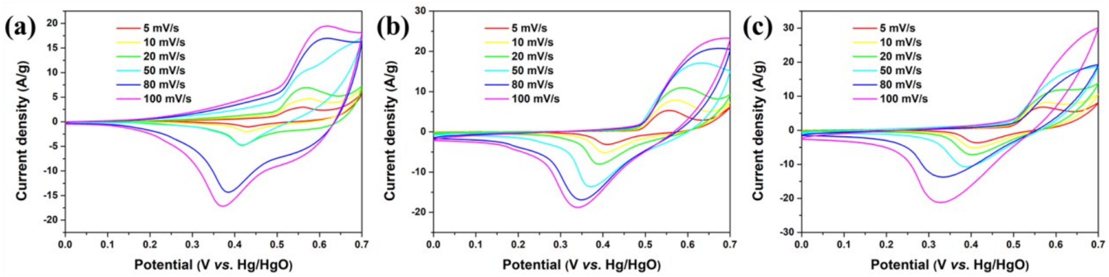


Figure S2. XPS survey spectra (a) TC-9 and (b) Ti_3C_2. High resolution XPS spectra of Ti_3C_2: (c) Ti 2p, (d) C 1s, (e) O 1s, and (f) F 1s.



<u>**Figure S3**. (a) CV curves of nickel foam, acetylene black and Ti_3C_2 electrodes at a scan rate of 5 mV/s, the inset is the CV curves of nickel foam and acetylene black. (b) CV curve of Ti_3C_2 in the potential range -0.8 - 07 V (the scan rate was 20 mV/s).</u>



<u>**Figure S4.** CV curves of the (a) CuS, (b) TC-6 and (c) TC-12 electrodes at various scan rates of 5, 10, 20, 50, 80 and 100 mV/s.</u>

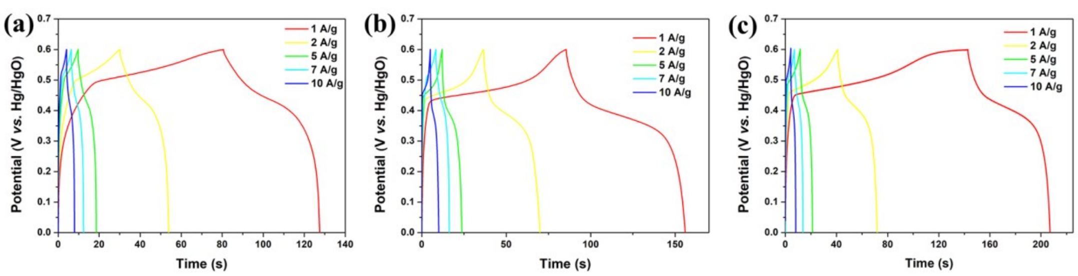


Figure S5. GCD curves of the (a) CuS and (b) TC-6 and (c) TC-12 electrodes at various current densities of 1, 2, 5, 7 and 10 A/g.

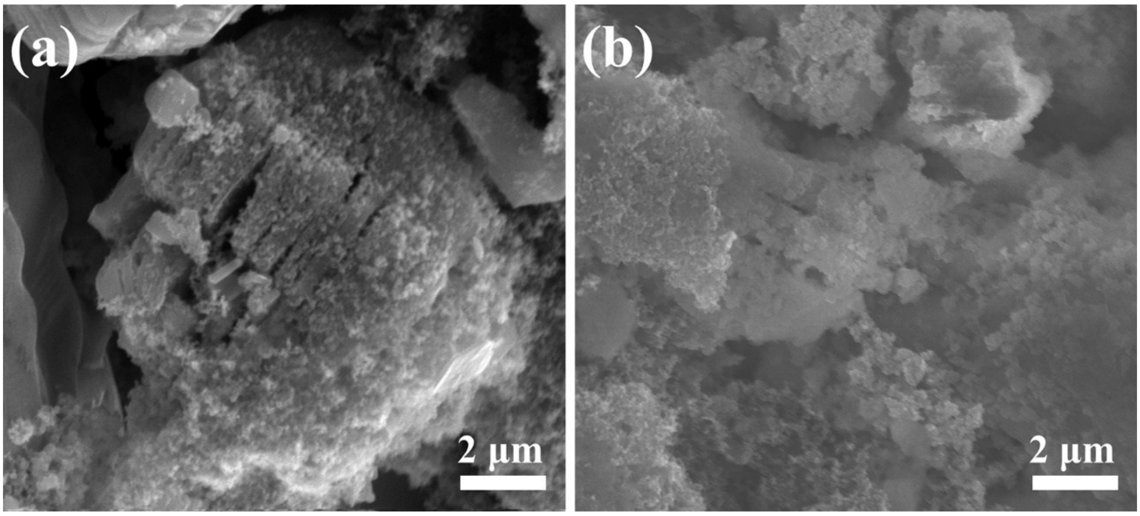


Figure S6. The SEM image of TC-9 electrode (a) before and (b) after a 5000-cycle test at 5 A/g.

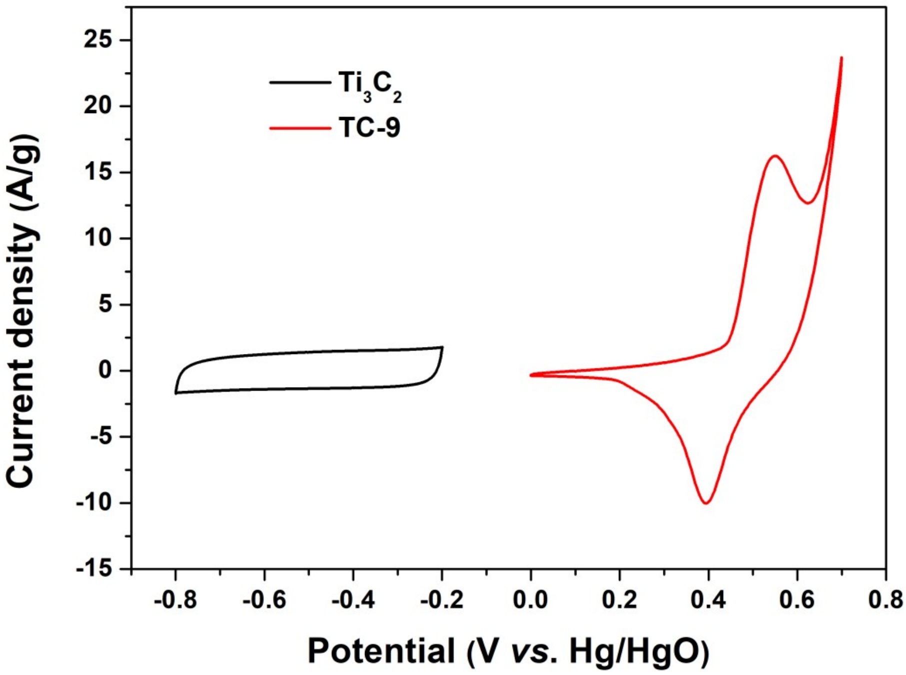


Figure S7. CV curves of Ti_3C_2 and TC-9 electrodes in different potential range at scan rate of 20 mV/s.

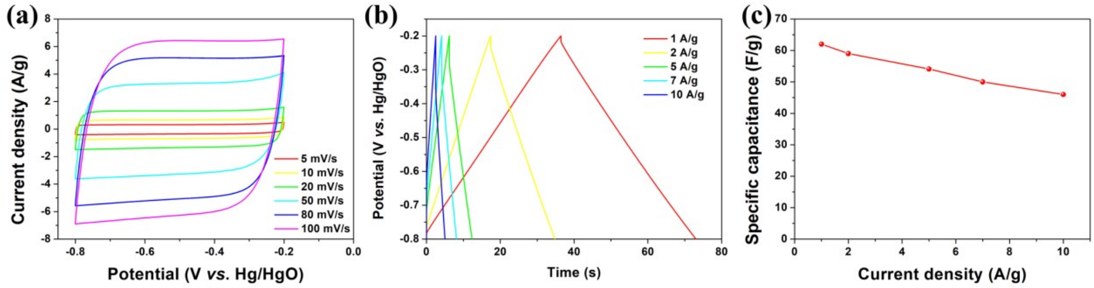


Figure S8. (a) CV curve of Ti_3C_2 in the potential range of -0.8 to -0.2 V; (b) GCD curves of the Ti_3C_2 in the potential range of -0.8 to -0.2 V. (c) Specific capacities of the Ti_3C_2 electrodes at various current densities.

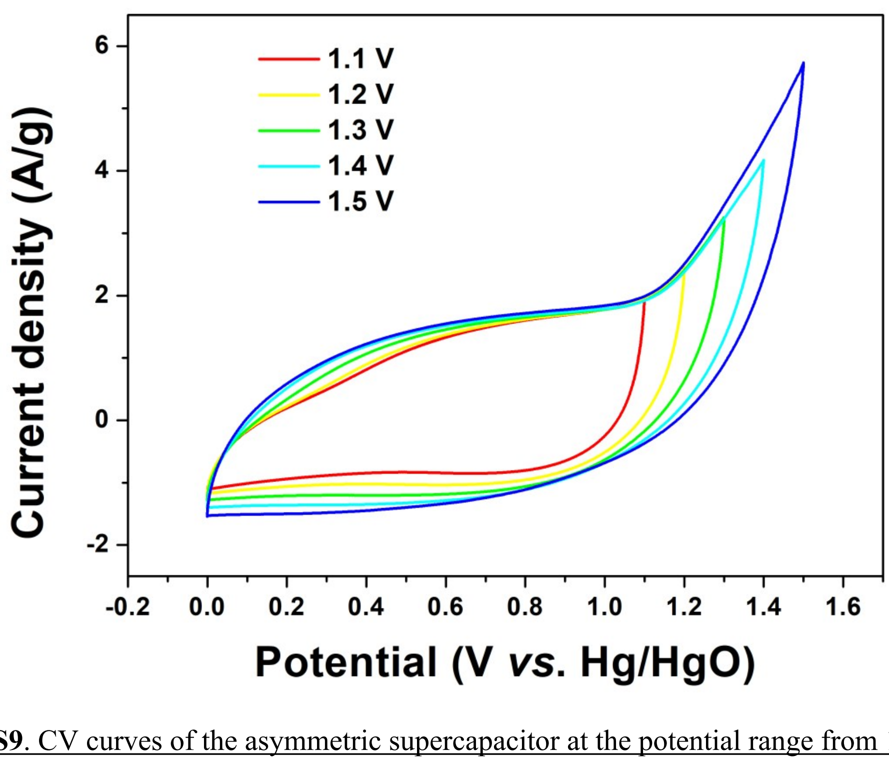


Figure S9. CV curves of the asymmetric supercapacitor at the potential range from 1.1V to 1.5V (the scan rate was 20 mV/s).

Table S1

Comparison of electrochemical performance of different electrodes for supercapacitors.

Materials	Electrolyte	Specific capacitance	Cycling stability	Ref.
CuS	2 M KOH	204 F g^{-1} at 2 A g^{-1}	74%/3000 cycles	[1]
CuS	1 M KOH	378 mF cm^{-2} at 2 mA cm^{-2}	91%/2000 cycles	[2]
CNT/CuS	2 M KOH	122 F g^{-1} at 1.2 A g^{-1}	96%/1000 cycles	[3]
d-Ti_3C_2	1 M KOH	134 F g^{-1} at 20 mV s^{-1}	94%/5000 cycles	[4]
N-doped Ti_3C_2	1 M H_2SO_4	192 F g^{-1} at 2 mV s^{-1}	92%/10000 cycles	[5]
TiO_2/Ti_3C_2	6 M KOH	143 F g^{-1} at 5 mV s^{-1}	92%/6000 cycles	[6]
RGO/Ti_3C_2	2 M KOH	154.3 F g^{-1} at 2 mV s^{-1}	85%/6000 cycles	[7]
MnO_2/Ti_3C_2	1 M KOH	212 F g^{-1} at 1 A g^{-1}	88%/10000 cycles	[8]
CuS/Ti_3C_2	1 M KOH	282 F g^{-1} (169 C g^{-1}) at 1 A g^{-1}	90.5%/5000 cycles	This work

d-: delaminated; N-: nitrogen-doped.

References

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