Table S1 A summary of various MXenes and their electrochemical performances as LIBs anode materials. (*) denotes the binder-free.

Materials	**Preparation**	**Current density/ Capacity/ Number of cycles**	**Voltage window**	**Configuration**	**Ref.**
Multi-layered Ti_2CT_x	Immersion of Ti_2AlC in 10 % HF at RT for 10 h	1 C, 110 mAh g^{-1}, 80; 10 C, 70 mAh g^{-1}, 200	0.05 to 2.5 V	Half-cell	154
TiO_2/Ti_2CT_x	Immersion of HF-etched multi-layered Ti_2CT_x in 30 wt. % H_2O_2 for 5 min	100 mA g^{-1}, 389 mAh g^{-1}, 50; 500 mA g^{-1}, 337 mAh g^{-1}, 100; 1000 mA g^{-1}, 280 mAh g^{-1}, 1000	0.005 to 3.0 V	Half-cell	68
Cu_2O/Ti_2CT_x	Hydrothermal synthesis of HCl/LiF-prepared Ti_2CT_x with stoichiometric amount of $Cu(CH_3COO)_2.H_2O$ at 150 °C for 10 h	1000 mA g^{-1}, 143 mAh g^{-1}, 250	0.05 to 2.5 V	Half-cell	155
Free-standing "paper" of $Ti_3C_2T_x$*	Typical HF etching, followed by DMSO-intercalation, sonication and filtration	1C, 410 mAh g^{-1}, 700; 36 C, 110 mAh g^{-1}, 700	0 to 2.5 V	Half-cell	31
Free-standing disc of 90 wt. % $Ti_3C_2T_x$/CB*	Immersion of Ti_3AlC_2 in 50 % HF at RT for 18 h, $Ti_3C_2T_x$ powders cold pressed at 1 GPa	C/3 (30 mA g^{-1}), 97 mAh g^{-1}, 5.9 mAh cm^{-2}(areal capacity), 50	0.005 to 3.0 V	Half-cell	156
Porous 90 wt. % $Ti_3C_2T_x$/ MWCNTs*	Filtration of mixture of acid treated, partial oxidized HCl/LiF-prepared $Ti_3C_2T_x$ as catalysed by Cu^{2+}, and MWCNTs	160 mA g^{-1}, ca. 800 mAh g^{-1}, 350	0.01 to 3.0 V	Half-cell	75
86.2 wt. % $Ti_3C_2T_x$/CNFs	Liquid-phase impregnation of HF-etched $Ti_3C_2T_x$ with PVP: $Co(NO_3)_2$) (mass ratio-1: 10), followed by CVD at 600°C for 0.5 h in Ar with acetylene	320 mA g^{-1}, 320 mAh g^{-1}, 300; 100 C, 97 mAh g^{-1}, 2900	0.01 to 3.0 V	Half-cell	58
PVP-Sn(IV)@ $Ti_3C_2T_x$	Intercalation of HF-etched $Ti_3C_2T_x$ with LiOH, followed by immersion in 1 M $SnCl_4$ with 0.1g of PVP at RT for 24 h then dried	500 mA g^{-1}, 544 mAh g^{-1}, 200	0.01 to 3.0 V	Half-cell	59
90 wt.% $Ti_3C_2T_x$/Ag	Direct reduction of 50 mg of $AgNO_3$ in the presence of 100 mg of HF-etched $Ti_3C_2T_x$ and 100 mL of DI water	1 C (320 mA g^{-1}), 310 mAh g^{-1}, 800; 10 C, 260 mAh g^{-1}, 1000 50 C, 150 mAh g^{-1}, 5000	0.01 to 3.0 V	Half-cell	78

Table S1 Continued.

Materials	Preparation	Current density/ Capacity/ Number of cycles	Voltage window	Configuration	Ref.
Free-standing film of 50 wt. % $Ti_3C_2T_x$/planar $NiCo_2O_4$	Alternatively spray coating of delaminated HCl/LiF $Ti_3C_2T_x$ and $NiCo_2O_4$ dispersions	1 C, 1010 mAh g^{-1}, 100	0.01 to 3.0 V	Half-cell	[157]
Multi-layered Nb_2CT_x	Immersion of Nb_2AlC in 50 % HF at RT for 90 h	1 C, 170 mAh g^{-1}, 150; 10 C, 110 mAh g^{-1}, 150	0 to 2.5 V	Half-cell	[15]
Free-standing film of 90 wt. % Nb_2CT_x/MWCNTs *	Immersion of Nb_2AlC in 50 % HF at 55 °C for 48 h, R-NH_3^+ intercalation, sonication; filtration of mixture of delaminated HF-etched Nb_2CT_x and MWCNTs	0.5 C, 420 mAh g^{-1}, 100; 2.5 C, 430 mAh g^{-1}, 300; 10 C, ca. 220 mAh g^{-1}, 100	1.0 to 3.0 V	Half-cell	[47]
Free-standing disc of 90 wt. % Nb_2CT_x/CB*	Immersion of Nb_2AlC in 50 % HF at 55 °C for 40 h, Nb_2CT_x powders cold pressed at 1 GPa	30 mA g^{-1}, 128 mAh g^{-1}, 6.7 mAh cm^{-2}(areal capacity), 50	0.005 to 3.0 V	Half-cell	[156]
Free-standing "paper" of 90 wt. % Nb_2CT_x-MWCNTs	Immersion of Nb_2AlC in 50 % HF at 55 °C for 48 h, TBAOH-intercalation, sonication and filtration of mixture with MWCNTs	50 mA g^{-1}, ca. 270 mAh g^{-1}, 100	0.01 to 3.0 V	Half-cell	[158]
Free-standing "paper" of 90 wt. % Nb_2CT_x-MWCNTs*	As above	250 mA g^{-1}, ca. 27 mAh g^{-1}, 540	0.01 to 3.0 V	Full-cell (with lithiated graphite as anode)	[158]
Free-standing "paper" of 90 wt. % Nb_2CT_x-MWCNTs*	As above	250 mA g^{-1}, ca. 12 mAh g^{-1}, 540	3.3 to 0.3 V	Full-cell (with pre-cycled $LiFePO_4$ as cathode)	[158]
Free-standing "paper" of 90 wt. % Nb_2CT_x-MWCNTs*	As above	250 mA g^{-1}, ca. 20 mAh g^{-1}, 940	0.01 to 3.0 V	Full symmetrical cell	[158]
Nb_2O_5@multi-layered $Nb_4C_3T_x$	Partial oxidation of HF-etched $Nb_4C_3T_x$ at 850 °C for 0.5 h under CO_2 flow rate of 75 sccm	0.25 C, 195 mAh g^{-1}, 400	0.05 to 2.0 V	Half-cell	[63]

Table S1 Continued.

Materials	Preparation	Current density/ Capacity/ Number of cycles	Voltage window	Configuration	Ref.
Multi-layered V_2CT_x	Immersion of V_2AlC or attrition-milled V_2AlC in 50 % HF at RT for 90 h or 8 h respectively	1 C, 210 to 260 mAh g^{-1}, 150; 10 C, 125 mAh g^{-1}, 150	0 to 3.0 V	Half-cell	[15]
Free-standing "paper" of $Mo_2TiC_2T_x$*	Immersion of Mo_2TiAlC_2 in 50 % HF at 55 °C for 48 h, DMSO-intercalation, sonication and filtration	1 C, 145 mAh g^{-1}, 160	0.02 to 3.0 V	Half-cell	[17]
Free-standing "paper" of 92 wt. % Mo_2CT_x-MWCNTs*	Immersion of Mo_2Ga_2C in 14M HF at 55 °C for 6.6 days, TBAOH-intercalation, sonication and alternating filtration with MWCNTs	5 A g^{-1}, 250 mAh g^{-1}, 1000; 10 A g^{-1}, 76 mAh g^{-1}, 1000	0.005 to 3.0 V	Half-cell	[32]

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Table S2 A summary of various MXenes and their electrochemical performances as supercapacitor electrodes.

Materials	**Preparation**	**Volumetric capacitance, Gravimetric capacitance**	**Scan rate or current density**	**Voltage window**	**Configuration**	**Ref.**
Delaminated $Ti_3C_2T_x$	Immersion of Ti_3AlC_2 6 M in HCl with LiF added, at 40 °C for 45 h	900 F cm^{-3}, 245 F g^{-1}	2 mV s^{-1}	-0.3 to 0.25 V	Three-electrode system, activated carbon counter electrode, Ag/AgCl/1 M KCl reference electrode, 1 M H_2SO_4 electrolyte	30
Delaminated $Ti_3C_2T_x$	Typical HF etching, followed by DMSO-intercalation, sonication	520 F cm^{-3}, 325 F g^{-1}; 415 F cm^{-3}	2 mV s^{-1}; 5 A g^{-1}	-0.4 to 0.2 V	As above	80
Delaminated $Ti_3C_2T_x$	Typical HF etching, followed by DMSO-intercalation, sonication	360 F cm^{-3}; 162 F cm^{-3}	2 mV s^{-1}; 200 mV s^{-1}	-0.8 to 0.1 V	Three-electrode system, activated carbon counter electrode, Ag/AgCl/1 M KCl reference electrode, 1 M $MgSO_4$ electrolyte	55
Mixed 95 wt. % $Ti_3C_2T_x$/SWCNTs	Filtration of mixture of delaminated HF-etched $Ti_3C_2T_x$ and SWCNTs	300 F cm^{-3}; 236 F cm^{-3}	2 mV s^{-1}; 200 mV s^{-1}	-0.8 to 0.1 V	As above	55
Sandwich-like 95 wt. % $Ti_3C_2T_x$/ SWCNTs	Alternating filtration of delaminated HF-etched $Ti_3C_2T_x$ and SWCNTs dispersions	390 F cm^{-3}; 280 F cm^{-3}; 345 F cm^{-3}	2 mV s^{-1}; 200 mV s^{-1}; 5 A g^{-1}	-0.8 to 0.1 V	As above	55
Mixed 95 wt. % $Ti_3C_2T_x$/MWCNTs	Filtration of mixture of delaminated HF-etched $Ti_3C_2T_x$ and MWCNTs	366 F cm^{-3}; 236 F cm^{-3}	2 mV s^{-1}; 200 mV s^{-1}	-0.8 to 0.1 V	As above	55

Table S2 Continued.

Materials	Preparation	Volumetric capacitance, Gravimetric capacitance	Scan rate or current density	Voltage window	Configuration	Ref.
Sandwich-like 95 wt. % $Ti_3C_2T_x$/ MWCNTs	Alternating filtration, with MWCNTs dispersion used instead	321 F cm^{-3}; 250 F cm^{-3}; 350 F cm^{-3}	2 mV s^{-1}; 200 mV s^{-1}; 10 A g^{-1}	-0.8 to 0.1 V	As above	[55]
Sandwich-like 95 wt. % $Ti_3C_2T_x$/onion-like carbon (OLC)	Alternating filtration, with OLC dispersion used instead	397 F cm^{-3}; 218 F cm^{-3}	2 mV s^{-1}; 200 mV s^{-1}	-0.8 to 0.1 V	As above	[55]
Sandwich-like 95 wt. % $Ti_3C_2T_x$/rGO	Alternating filtration, with rGO dispersion used instead	435 F cm^{-3}; 320 F cm^{-3}; 370 F cm^{-3}	2 mV s^{-1}; 200 mV s^{-1}; 10 A g^{-1}	-0.8 to 0.1 V	As above	[55]
92 wt. % $Ti_3C_2T_x$/PPy	Filtration of mixture of HCl/LiF-prepared $Ti_3C_2T_x$ and PPy	1000 F cm^{-3}, 416 F g^{-1}	5 mV s^{-1}	-0.2 to 0.35 V	Three electrode system, activated carbon counter electrode, Ag/AgCl reference electrode, 1 M H_2SO_4 electrolyte	[56]
64.3wt. % PPy/ $Ti_3C_2T_x$	Electrophoretic deposition of HF-etched $Ti_3C_2T_x$, electrochemical polymerization of PPy	291 F cm^{-3}, 485 F g^{-1}	1 mA cm^{-2}	0.0 to 0.5 V	Three electrode system, saturated calomel reference electrode, 0.5 M H_2SO_4 electrolyte	[162]
$Ti_3C_2T_x$ EMI-TFSI ionogel film	Filtration of mixture of HCl/LiF-prepared $Ti_3C_2T_x$, then immerse I EmI-TFSI electrolyte	62 F g^{-1}	20 mV s^{-1}	0.0 to 3.0 V	Two-electrode Swagelok symmetric cell, EMI-TFSI electrolyte	[163]
80 wt. % $Ti_3C_2T_x$/MWCNTs	Filtration of mixture of HCl/LiF-prepared $Ti_3C_2T_x$ and MWCNTs	245 F cm^{-3}, 85 F g^{-1}; 76 F g^{-1}	2 mV s^{-1}; 1 A g^{-1}	-0.4 to -0.2 V	Three-electrode system, activated carbon counter electrode, Ag wire reference electrode, 1 M EMITFSI in acetonitrile	[164]

					electrolyte	

Table S2 Continued.

Materials	**Preparation**	**Volumetric capacitance, Gravimetric capacitance**	**Scan rate or current density**	**Voltage window**	**Configuration**	**Ref.**
$Ti_3C_2T_x$/MWCNTs	Filtration of mixture of delaminated HF-etched $Ti_3C_2T_x$ and MWCNTs	393 F cm^{-3}	5 mV s^{-1}	0.1 to 0.55 V	Three-electrode system, platinum counter electrode, Hg/HgO reference electrode, 6 M KOH electrolyte	[165]
TiO_2/HF-etched multi-layered $Ti_3C_2T_x$	In situ hydrolysis of TBOT within mixture of HF-etched multi-layered $Ti_3C_2T_x$, heat treatment	143 F g^{-1}	5 mV s^{-1}	-1.0 to -0.35 V	Three-electrode system, platinum counter electrode, Ag/AgCl/3 M KCl reference electrode, 6 M KOH electrolyte	[71]
50 wt. % ε-MnO_2/$Ti_3C_2T_x$	Impregnation of HF- etched $Ti_3C_2T_x$ with $MnSO_4$ at 60 °C then oxidized with $KMnO_4$	211 F g^{-1}; 212 F g^{-1}	10 mV s^{-1}; 1 A g^{-1}	0.0 to 0.7 V	Two-electrode symmetric cell, in 30 wt. % KOH electrolyte	[166]
MnO_2/$Ti_3C_2T_x$	Addition of $Mn(NO_3)_2$ and $KMnO_4$ to HF-etched $Ti_3C_2T_x$, followed by sintering at 300 °C for 3 h in N_2	130 F g^{-1}	5 mV s^{-1}	-1.0 to -0.4 V	Three-electrode system, platinum counter electrode, Ag/AgCl/3 M KCl reference electrode, 6 M KOH electrolyte	[167]
38 wt. % delaminated HF-etched $Ti_3C_2T_x$/nickel-aluminium layered double hydroxide composite	Addition of Ni-containing parent solution, H_3BO_3 and $Al(NO_3)_3$ to delaminated HF-etched $Ti_3C_2T_x$, stirred for 48 h at 50 °C	1061 F g^{-1}; 556 F g^{-1}	1 A g^{-1}; 10 A g^{-1}	0.0 to 0.6 V	Three-electrode system, platinum counter electrode, saturated calomel reference electrode, 6 M KOH electrolyte	[168]

Table S2 Continued.

Materials	Preparation	Volumetric capacitance, Gravimetric capacitance	Scan rate or current density	Voltage window	Configuration	Ref.
All solid-state HCl/LiF etched $Ti_3C_2T_x$ (ca. 1 µm), with a PVA/H_2SO_4 gel electrolyte	Sequential spray-coating HCl/LiF etched $Ti_3C_2T_x$ (3–6 µm) and HCl/LiF etched $Ti_3C_2T_x$ (1 µm), drip casting of PVA/H_2SO_4 gel electrolyte	357 F cm^{-3}	20 mV s^{-1}	0 to 0.6 V	Two-electrode, symmetrical all solid-state HCl/LiF etched $Ti_3C_2T_x$ microsupercapacitors	169
Free-standing "paper" of delaminated HF-etched $Mo_2TiC_2T_x$*	Immersion of Mo_2TiAlC_2 in 50 % HF at 55 °C for 48 h, DMSO-intercalation, sonication and filtration	413 F cm^{-3}	2 mV s^{-1}	-0.1 to 0.4 V	Three-electrode system, activated carbon counter electrode, Ag/AgCl/1 M KCl reference electrode, 1 M H_2SO_4 electrolyte	17
Free-standing "paper" of delaminated HF-etched Mo_2CT_x*	Immersion of Mo_2Ga_2C in 14M HF at 55 °C for 6.6 days, TBAOH-intercalation, sonication and filtration	196 F g^{-1}	2 mV s^{-1}	-0.30 to 0.30 V	Three-electrode system, activated carbon counter electrode, Ag/AgCl/1 M KCl reference electrode, 1 M H_2SO_4 electrolyte	32
Orthorhombic Nb_2O_5/amorphous carbon/Nb_2CT_x	Partial oxidation of HF-etched Nb_2CT_x at 850 °C for 1h in CO_2	275 F g^{-1}	5 mV s^{-1}	-1.95 to 0 V	Three-electrode system, activated carbon counter electrode, AgCl coated Ag wire as reference electrode, 1 M$LiClO_4$/EC/DMC electrolyte	64

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