Supplementary Information (SI) for Nanoscale.
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Supplementary Information

Molten salt shielded solid-state synthesis (MS^5) reaction driven >99 % pure Ti_3AlC_2 MAX phase: Effect of MAX phase purity on interlayer separation of MXene and Na-ion storage

Ekta Choudhary,[a,b] Vishesh Manjunath,[a] Ramchandra Kalubarme,[c] Ravindra Jangir,[d,e*] and Rupesh S. Devan,[a,f,g*]

[a]Department of Metallurgical Engineering and Materials Science, Indian Institute of Technology Indore, Simrol, Khandwa Road, Indore, 453552, India

[b]Department of Physics, Indian Institute of Technology Indore, Simrol, Khandwa Road, Indore, 453552, India

[c]Centre for Materials for Electronics Technology, Pune, 411008, India

[d]Accelerator Physics and Synchrotrons Utilization Division, Raja Ramanna Centre for Advanced Technology, Indore 452013, India

[e]Homi Bhabha National Institute, Anushakti Nagar, Mumbai, 400094, India

[f]Centre for Electric Vehicle & Intelligent Transport System, Indian Institute of Technology Indore, Simrol, Khandwa Road, Indore, 453552, India

[g]Multidisciplinary Academic Research Centre, National Dong Hwa University, Hualien 974301, Taiwan.

*Corresponding authors: email: rjangir.cat@gmail.com & rupesh@iiti.ac.in

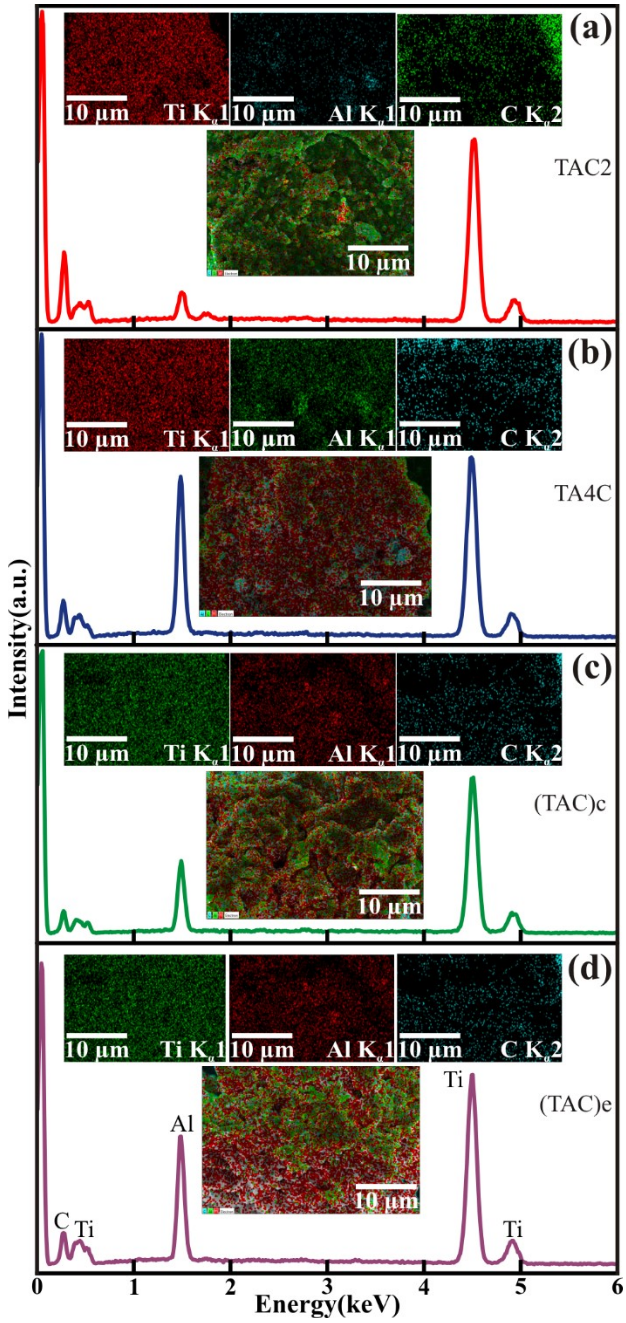

Figure S1. EDS spectra and the corresponding elemental mapping of (a) TAC2, (b) TA4C, (c) (TAC)6, and (d) (TAC)c showing the difference in elemental concentration of $TiK_{\alpha1}$, $AlK_{\alpha1}$, and $CK_{\alpha2}$ with varying the precursor weight ratio, holding time and temperature.

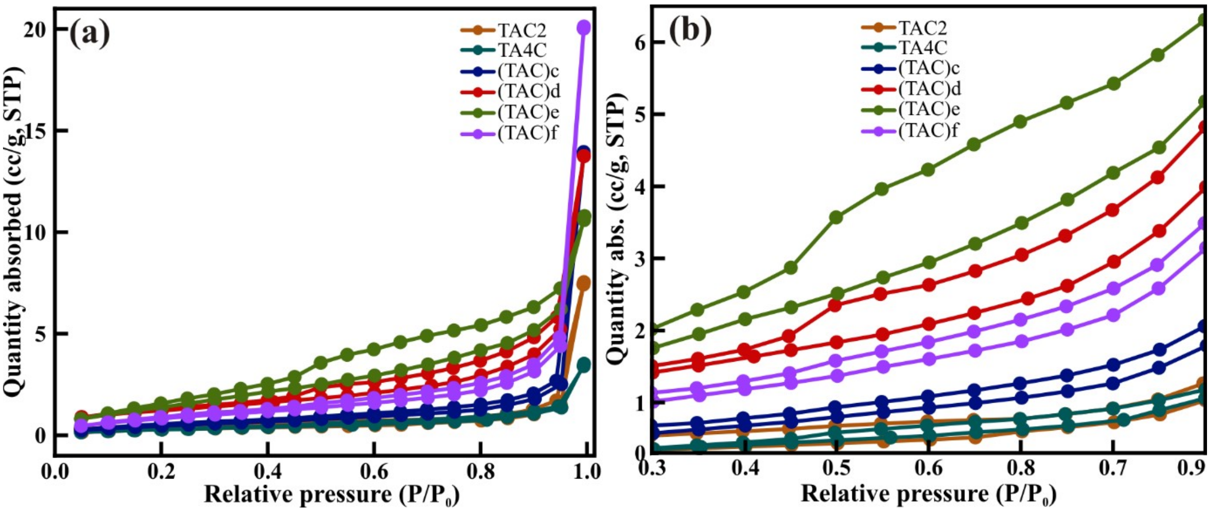

Figure S2. (a) BET curves and (b) their magnified image in the relative pressure 0.3-0.9 P/P_0 of various MAX phases prepared by varying weight ratio, reaction temperature, and time of the molten salt solid-state reaction from which BET surface area is evaluated.

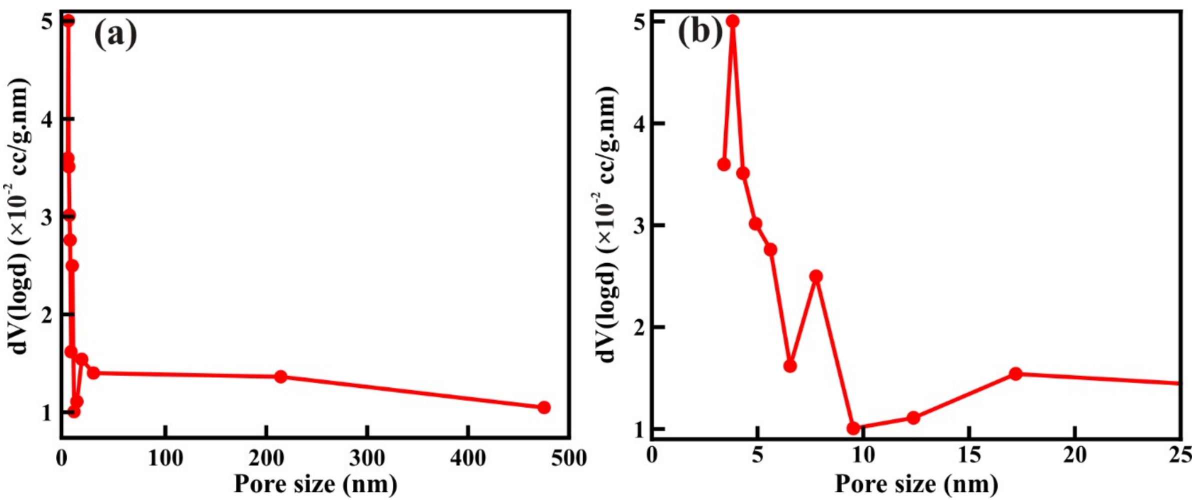

Figure S3. (a) BJH pore size distribution and (b) magnified view till 20 nm for 2D Ti_3C_2-F MXenes obtained from HF etching of optimized (TAC)e MAX phase.

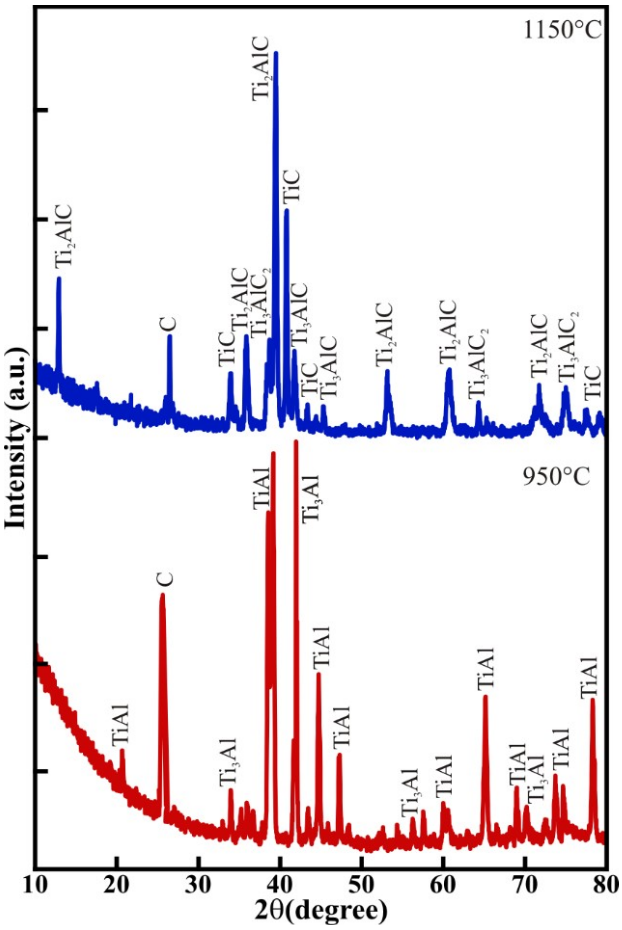

Figure S4. XRD pattern at 950 ℃ and 1150 ℃ temperature.

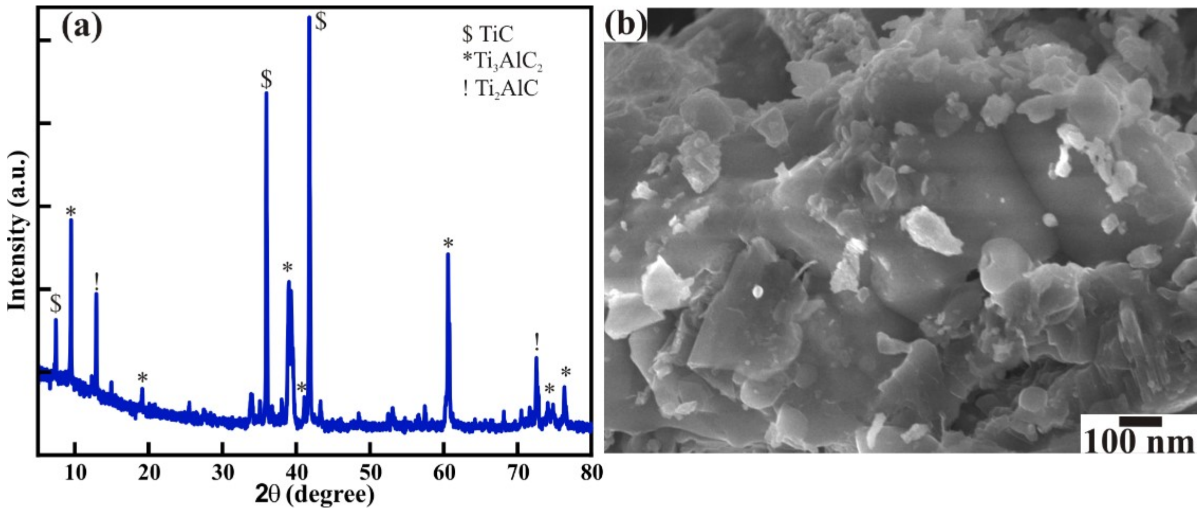

Figure S5. (a) XRD pattern, and (b) FESEM image of Ti_3AlC_2 MAX phase processed at 1400 ℃ temperature.

Table S1. Comparison of Ti_3C_2-F MXene Performance in Na-ion Batteries

Material	Capacity	Rate	Cyclic stability	Ref.
Ti_3C_2-T_x	100 mAh g^{-1}	30 mA g^{-1}	Retention after 50 cycles	[1]
Ti_3C_2-T_x	79 mAh g^{-1}	0.2 A g^{-1}	Retention after 500 cycles	[2]
Ti_3C_2-T_x	68.3 mAh g^{-1}	0.2 A g^{-1}	Retention after 1000 cycles	[3]
a- Ti_3C_2-T_x	50 mAh g^{-1}	0.2 A g^{-1}	Retention after 500 cycles	[4]
c- Ti_3C_2-T_x	246 mAh g^{-1}	0.02 A g^{-1}	Retention after 50 cycles	[5]
TiO2/ Ti_3C_2-T_x	124 mAh g^{-1}	50 mA g^{-1}	Retention after 400 cycles	[6]
Ti_3C_2-F	142 mAh g^{-1}	50 mA g^{-1}	89.7% retention after 500 cycles	This work

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