

Supporting information

Investigation of charge carrier dynamics in $Ti_3C_2T_x$ MXene for ultrafast photonics applications

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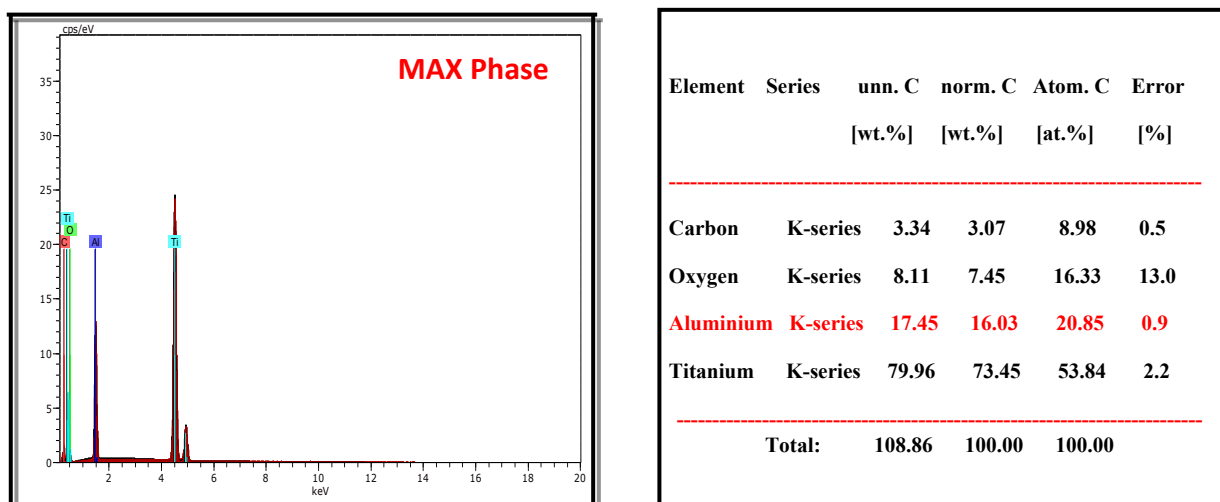
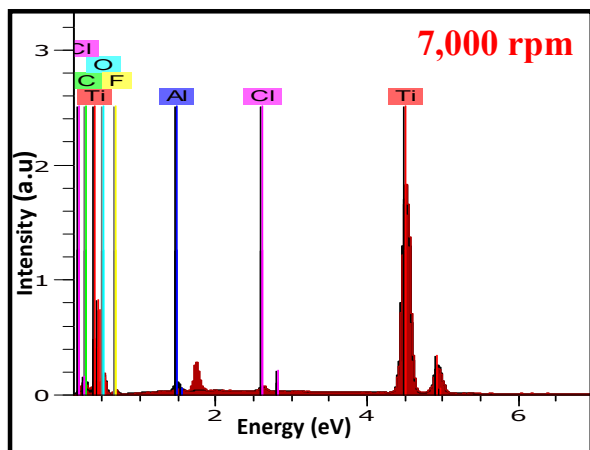
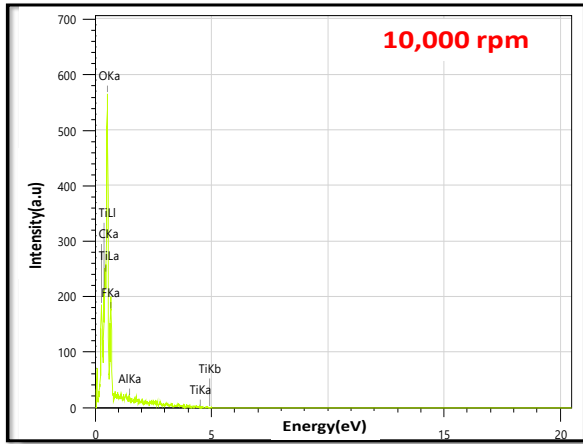


Figure 1: The elemental distributions for Ti_3AlC_2 MAX phase.



Element	Series	unn. C [wt.%]	norm. C [wt.%]	Atom. C [at.%]	Error [%]
Titanium	K-series	64.43	62.59	36.93	1.9
Carbon	K-series	3.28	3.18	7.49	1.0
Aluminium	K-series	1.26	1.23	1.29	0.1
Oxygen	K-series	20.71	20.12	35.53	34.1
Chlorine	K-series	0.56	0.55	0.44	0.1
Fluorine	K-series	12.69	12.33	18.33	4.2
Total:		102.93	100.00	100.00	

Figure 2: The elemental distributions for Ti_3C_2Tx MXenes at 7,000 rpm (S1)



Element	Line	Mass%	Atom %
C	K	3.77±0.06	8.93±0.15
O	K	21.85±0.39	38.88±0.69
F	K	8.74±0.28	13.09±0.42
Al	K	0.19±0.12	0.20±0.13
Ti	L	65.45±1.99	38.89±1.18
Total		100.00	100.00
		Fitting ratio 0.1565	

Figure 3: The elemental distributions for Ti_3C_2Tx MXenes at 10,000 rpm (S2)

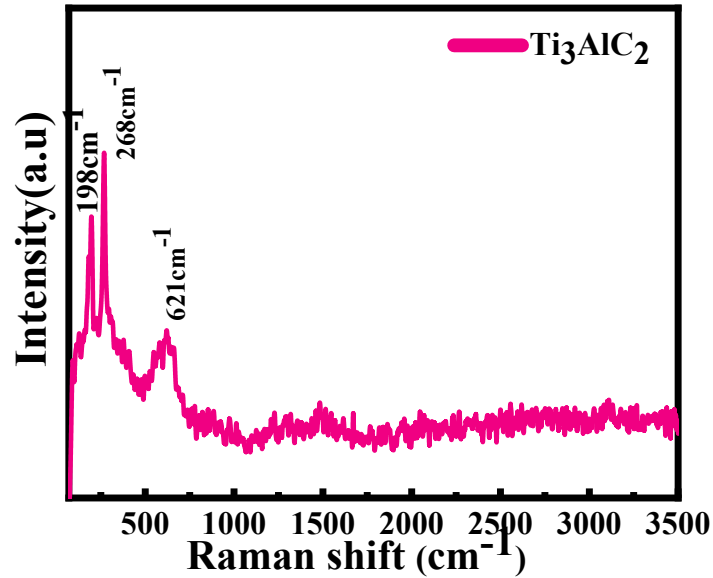


Figure 4: Raman spectra of Ti_3AlC_2 MAX phase.

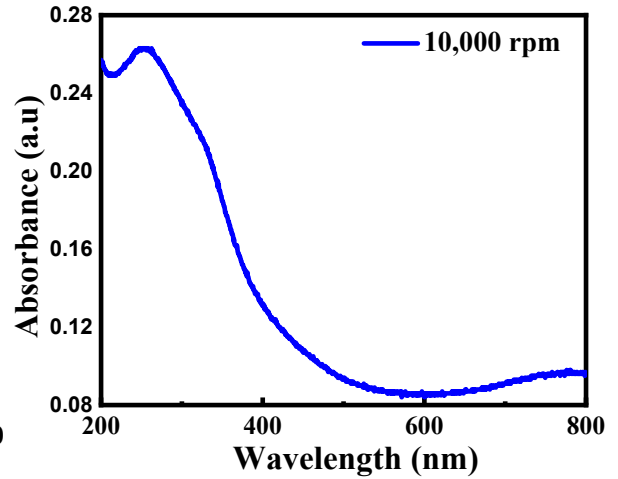
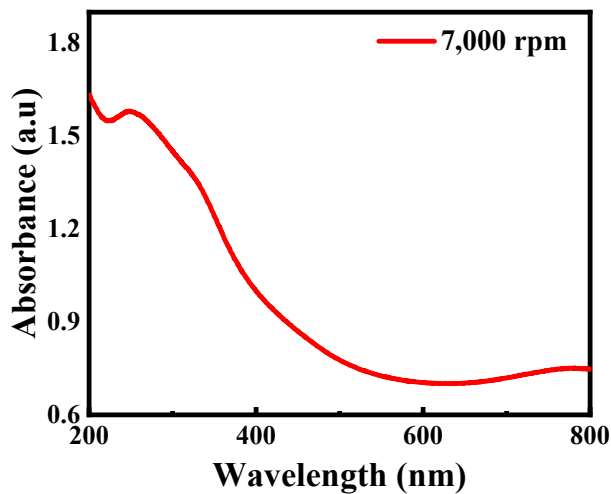


Figure 5: Absorption spectra of different rpm MXene supernatant S1 and S2.