Supporting information

Molten salts assisted synthesis and electromagnetic wave absorption properties of $(V_{1-x-y}Ti_xCr_y)_2AlC$ solid solutions

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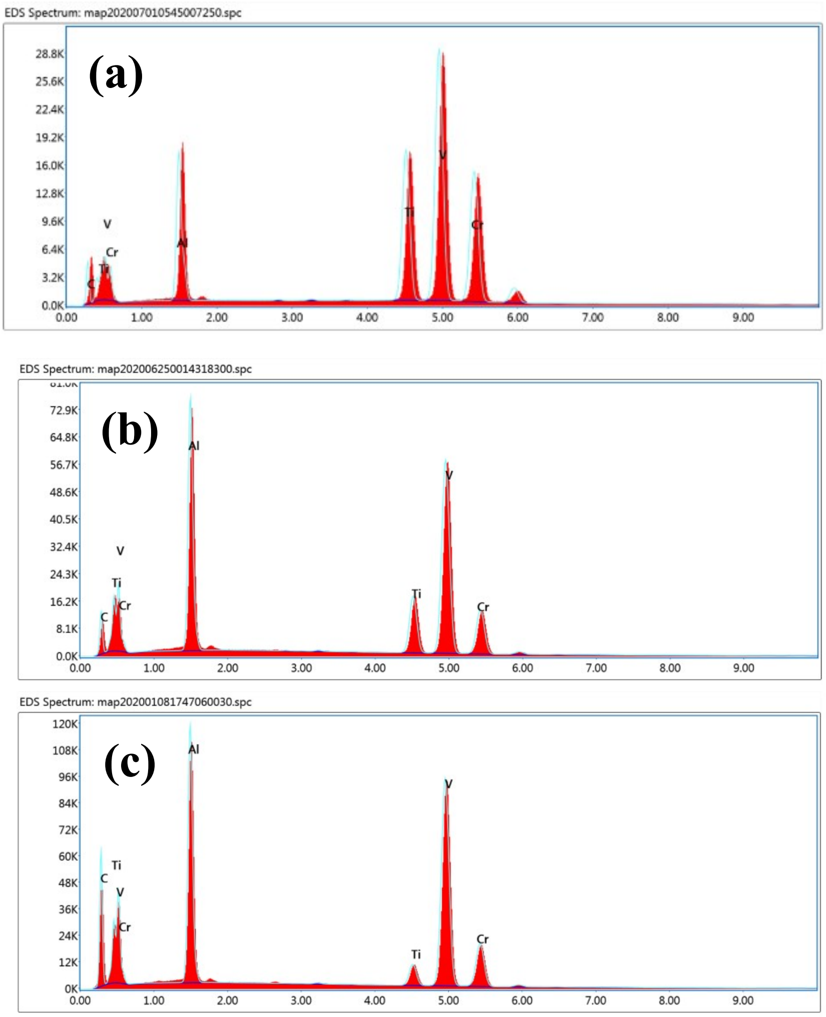

Fig. S1. EDX mapping results of the (a) $(V_{1/3}Ti_{1/3}Cr_{1/3})_2AlC$, (b) $(V_{0.6}Ti_{0.2}Cr_{0.2})_2AlC$ and (c) $(V_{0.8}Ti_{0.1}Cr_{0.1})_2AlC$.

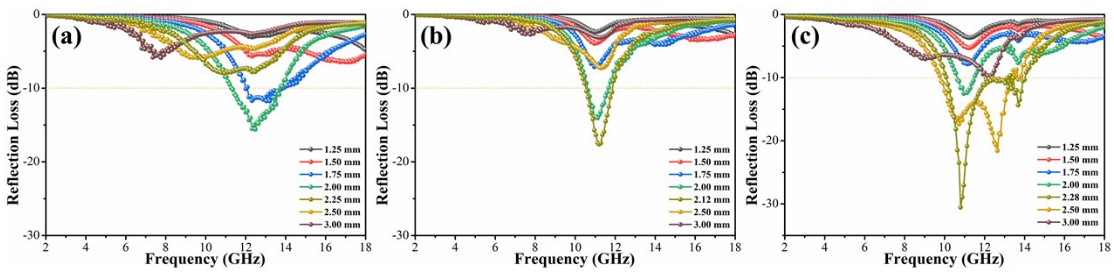

Fig. S2. Frequency dependence of calculated reflection loss curves for (a) V_2AlC, (b) Cr_2AlC and (c) Ti_2AlC.

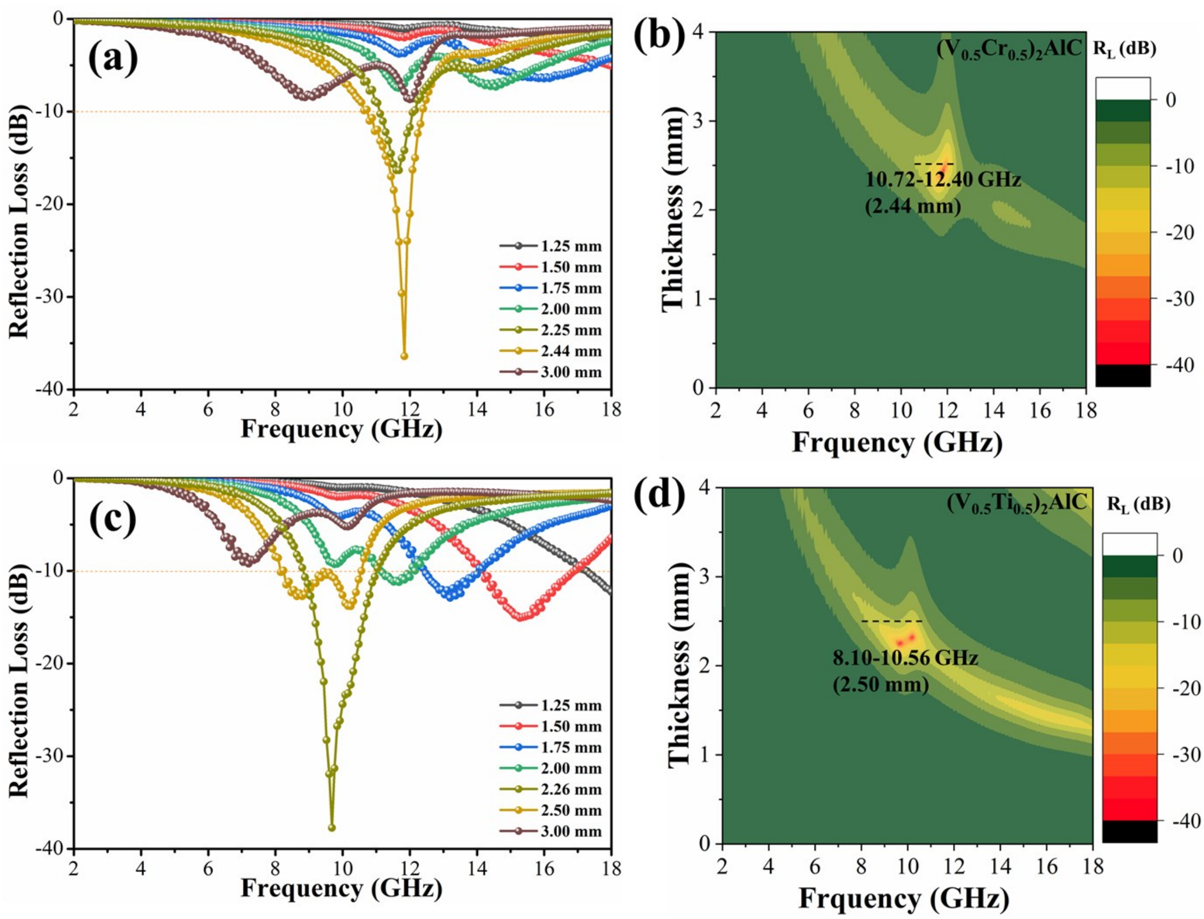

Fig. S3. Frequency dependence of calculated reflection loss curves and 2D color maps for $(V_{0.5}Cr_{0.5})_2AlC$ (a-b) and $(V_{0.5}Ti_{0.5})_2AlC$ (c-d).

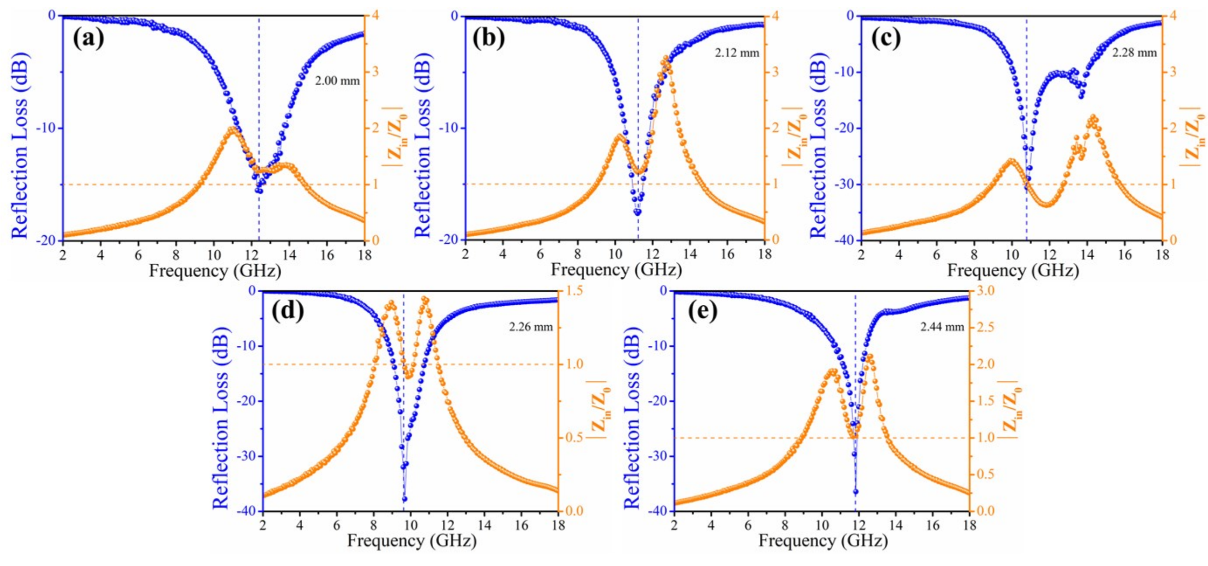

Fig. S4. $|Z_{in}/Z_0|$vs R_L value of as-prepared (a) V_2AlC, (b) Cr_2AlC, (c) Ti_2AlC, (d) $(V_{0.5}Ti_{0.5})_2AlC$ and (e) $(V_{0.5}Cr_{0.5})_2AlC$.

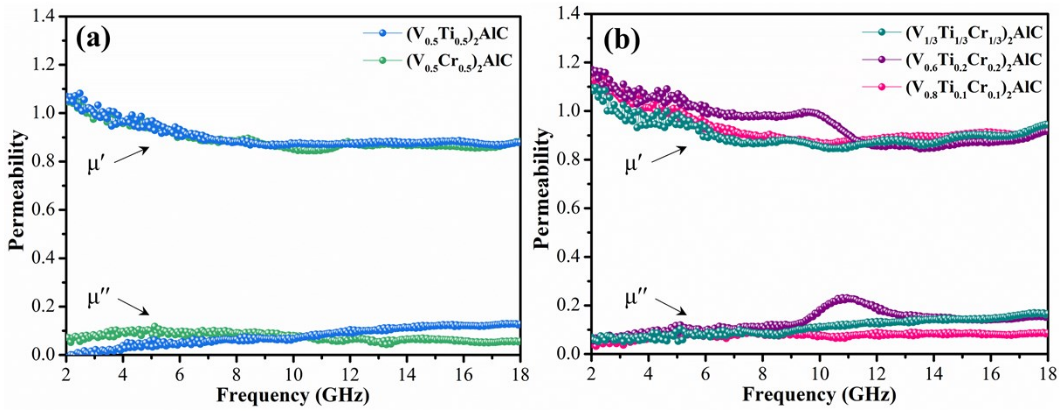

Fig. S5. The magnetic permeability of as-prepared $(V_{1-x-y}Ti_xCr_y)_2AlC$ solid solution.

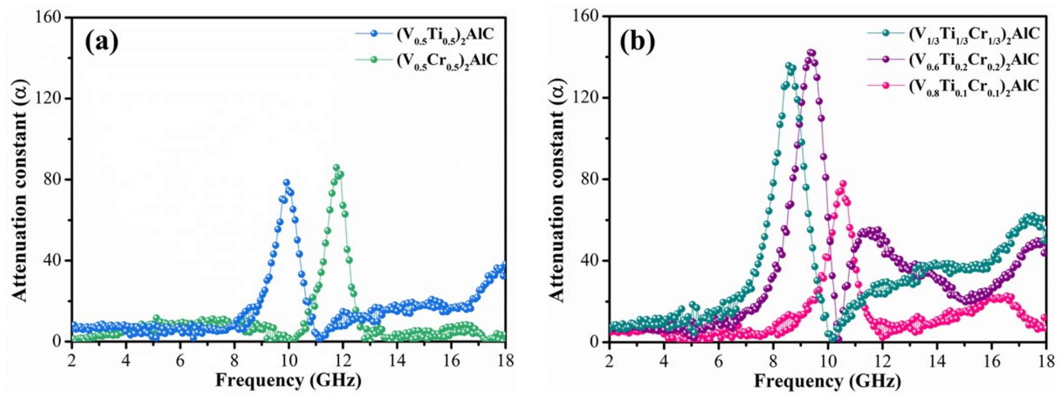

Fig. S6. The attenuation constant (a) of as-prepared $(V_{1-x-y}Ti_xCr_y)_2AlC$ solid solution.

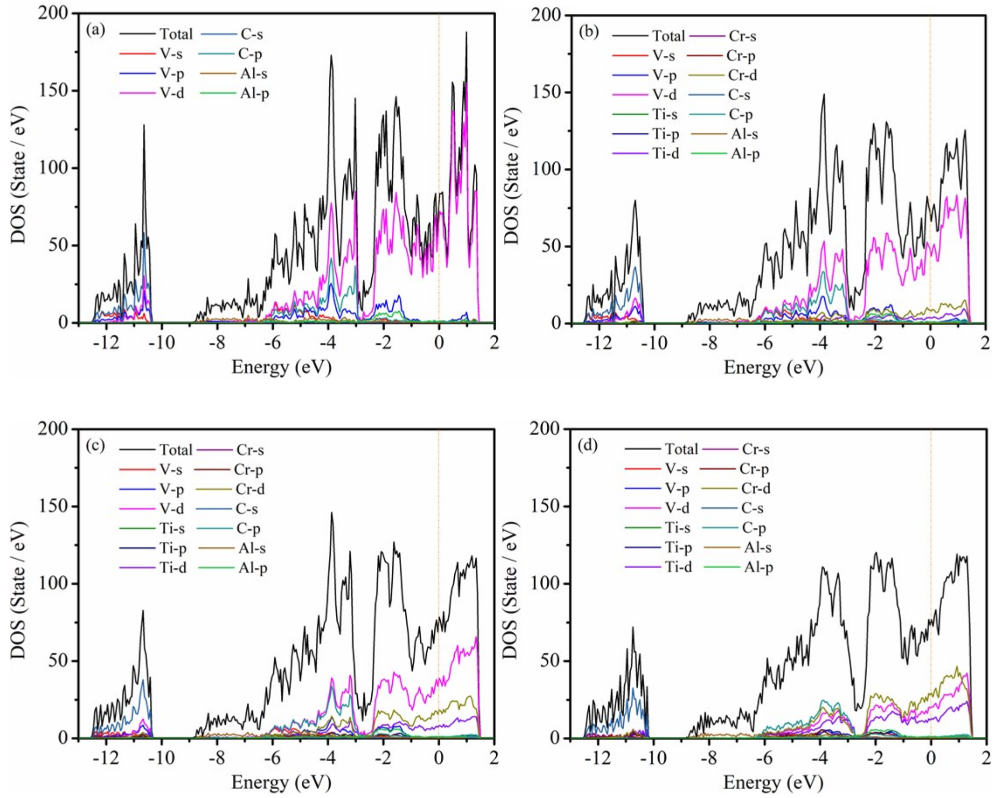

Fig. S7. (a-d) density of states for V based MAX phases. The vertical lines are used to refer Fermi level.

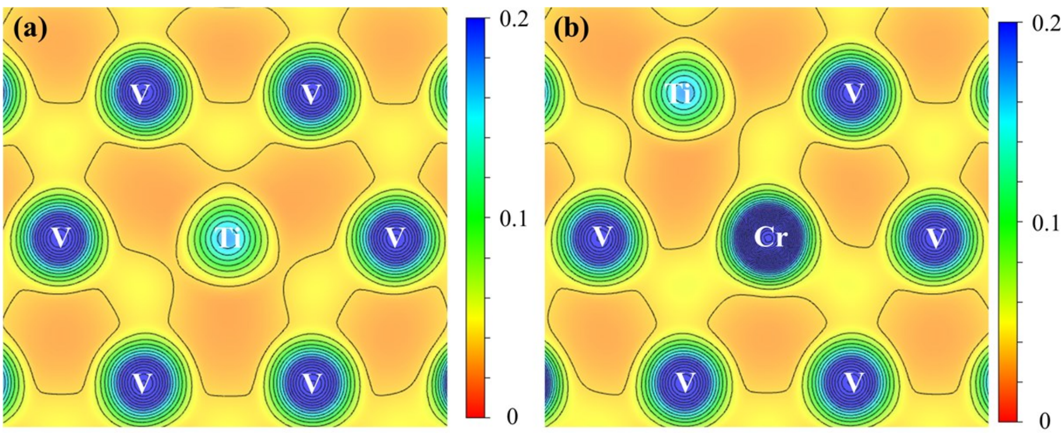

Fig. S8. Total charge density maps of M atomic layers in doped MAX phases: (a) low doping amount and (b) high doping amount.

Table S1 The element concentration of obtained $(V_{1-2x}Ti_xCr_x)_2AlC$ from SEM-EDX mappings.

Stoichiometric ratio of V: Ti: Cr	Theoretical			Experimental		
	V	Ti	Cr	V	Ti	Cr
$(V_{0.8}Ti_{0.1}Cr_{0.1})_2AlC$	0.8	0.1	0.1	0.77	0.10	0.13
$(V_{0.6}Ti_{0.2}Cr_{0.2})_2AlC$	0.6	0.2	0.2	0.63	0.17	0.20
$(V_{0.33}Ti_{0.33}Cr_{0.33})_2AlC$	0.33	0.33	0.33	0.43	0.30	0.27