Supplementary material for

Enhancing Phase Stability in Low-Activation TiVTa-based Alloys through CALPHAD-Guided Design

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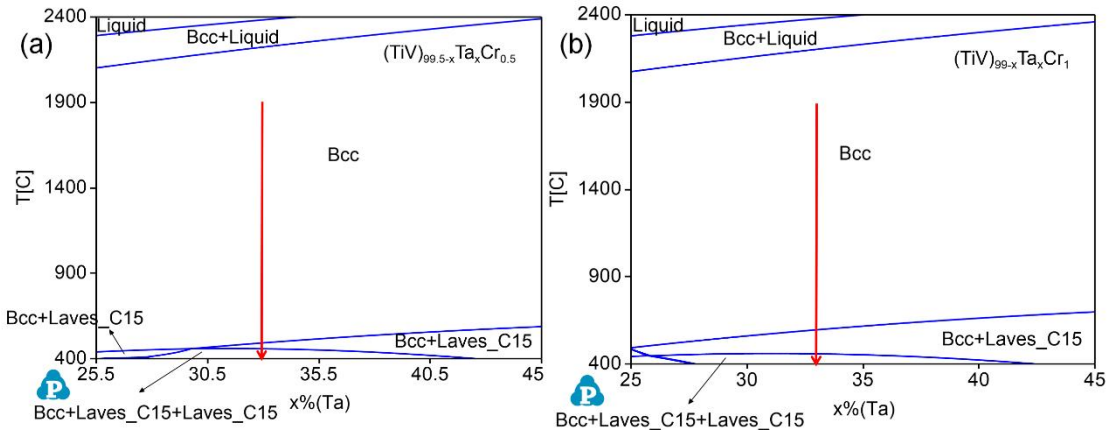

Fig. S1 The solubility regimes in (a) $(TiV)_{99-x}Ta_xCr_1$ and (b) $(TiV)_{99.5-x}Ta_xCr_{0.5}$ ($Ti_{33}V_{33}Ta_{33.5}Cr_{0.5}$ and $Ti_{33}V_{33}Ta_{33}Cr_1$ are marked by red arrows.)

Table S-I Phase composition and lattice constants of the alloys in the as-cast state and after annealing at 500℃ and 700℃ for 24 h, as determined by XRD.

Alloys	As-cast	Lattice constant (Å)	500℃ 24 h	Lattice constant (Å)	700℃ 24 h	Lattice constant (Å)
$Ti_{33}V_{33}Ta_{34}$	BCC	3.2213	BCC	3.2312	BCC	3.2299
$Ti_{29}V_{28}Ta_{43}$	BCC	3.2372	BCC	3.2394	BCC	3.2340
$Ti_{34}V_{30}Ta_{36}$	BCC	3.2310	BCC	3.2322	BCC	3.2177

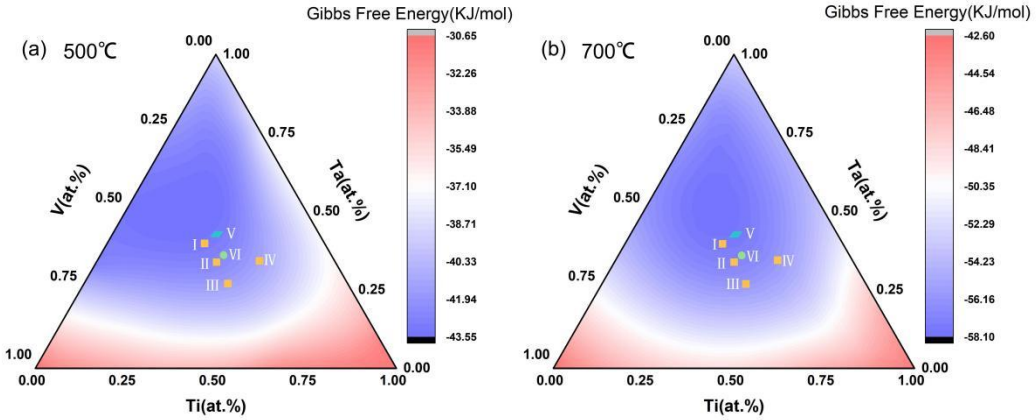

Fig. S2 (a) and (b) Calculated Gibbs free energy of TiVTa ternary alloys at 500℃ and 700℃. The alloys were marked using I ($Ti_{27}V_{33}Ta_{40}$), II ($Ti_{33}V_{33}Ta_{34}$), III ($Ti_{40}V_{33}Ta_{27}$), IV ($Ti_{45}V_{20}Ta_{35}$), V ($Ti_{29}V_{28}Ta_{43}$), VI ($Ti_{34}V_{30}Ta_{36}$).