Al-Np (Aluminum-Neptunium)

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The Al-Np phase diagram was unknown in [Massalski2]. Figure 1 shows the Al-Np phase diagram proposed by [2010Sed]. Because experimental data on the Al-Np system are very scarce, the thermodynamic properties of this system were estimated based on interpolation of liquid behavior between Al-U and Al-Pu and ab-initio enthalpies of formation for the intermediate phases. The invariant reaction temperatures labeled in Fig. 1 were read from the figure.

Table 1 shows Al-Np crystal structure data given in [Massalski2].

Reference

2010Sed: D. Sedmidubský, R.J.M. Konings, and P. Souček, Ab-Initio Calculations and Phase Diagram Assessments of An-Al Systems, *J. Nucl. Mater.*, 2010, **397**, p 1-7

Table 1 Al-Np crystal structure data

Phase	Composition, at.% Np	Pearson symbol	Space group	Strukturbericht designation	Prototype
(Al)	0	<i>cF4</i>	<i>Fm</i> $\bar{3}$ <i>m</i>	<i>A1</i>	Cu
Al ₄ Np	20	<i>oI20</i>	<i>Imma</i>	<i>D1</i> _b	Al ₄ U
Al ₃ Np	25	<i>cP4</i>	<i>Pm</i> $\bar{3}$ <i>m</i>	<i>L1</i> ₂	AuCu ₃
Al ₂ Np	33.3	<i>cF24</i>	<i>Fd</i> $\bar{3}$ <i>m</i>	<i>C15</i>	Cu ₂ Mg
(γ Np)	100	<i>cI2</i>	<i>Im</i> $\bar{3}$ <i>m</i>	<i>A2</i>	W
(β Np)	100	<i>tP4</i>	<i>P2</i> ₁ <i>2</i> ₁ <i>2</i>	<i>A</i> _d	β Np
(α Np)*	100	<i>oP8</i>	<i>Pnma</i>	<i>A</i> _c	α Np

* <280 °C

Fig. 1 Al-Np phase diagram