

Er-Ni (Erbium-Nickel)

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The Er-Ni phase diagram in [Massalski2] was adopted from [1991Pan]. Figure 1 shows the Er-Ni phase diagram calculated by [1999Du] by optimizing available thermodynamic and phase boundary data. The difference between the diagrams of [1991Pan] and [1999Du] is not significant, but the diagram of [1999Du] based on a thermodynamic model is probably a better representation of the existing phase boundary data. However, as pointed out by [1993Oka], it is unlikely that two compounds with similar compositions, such as $\text{Er}_4\text{Ni}_{17}$ and $\text{Er}_5\text{Ni}_{22}$ in Fig. 1, coexist over a wide temperature range. The thermodynamic model of [1999Du] apparently indicates instability of some compounds other than $\text{Er}_5\text{Ni}_{22}$. This feature is not reflected in Fig. 1. Therefore, further refinement of the thermodynamic model and the

phase diagram may be helpful, particularly so with respect to the crystallographic relationship of $\text{Er}_{14}\text{Ni}_{17}$ and $\text{Er}_5\text{Ni}_{22}$.

The Er-Ni crystal structure data in Table 1 are adopted from [Massalski2] with additional information from [Pearson4].

References

- 1991Pan:** Y.Y. Pan and P. Nash: in *Phase Diagrams of Binary Nickel Alloys*, P. Nash, ed., ASM International, Materials Park, OH, pp. 101-06.
1993Oka: H. Okamoto and T.B. Massalski: *J. Phase Equilibrium*, 1993, vol. 14 (3), pp. 316-35.
1999Du: Z. Du, D. Wang, and W. Zhang, *J. Alloys Compounds*, 1999, vol. 284, pp. 206-12.

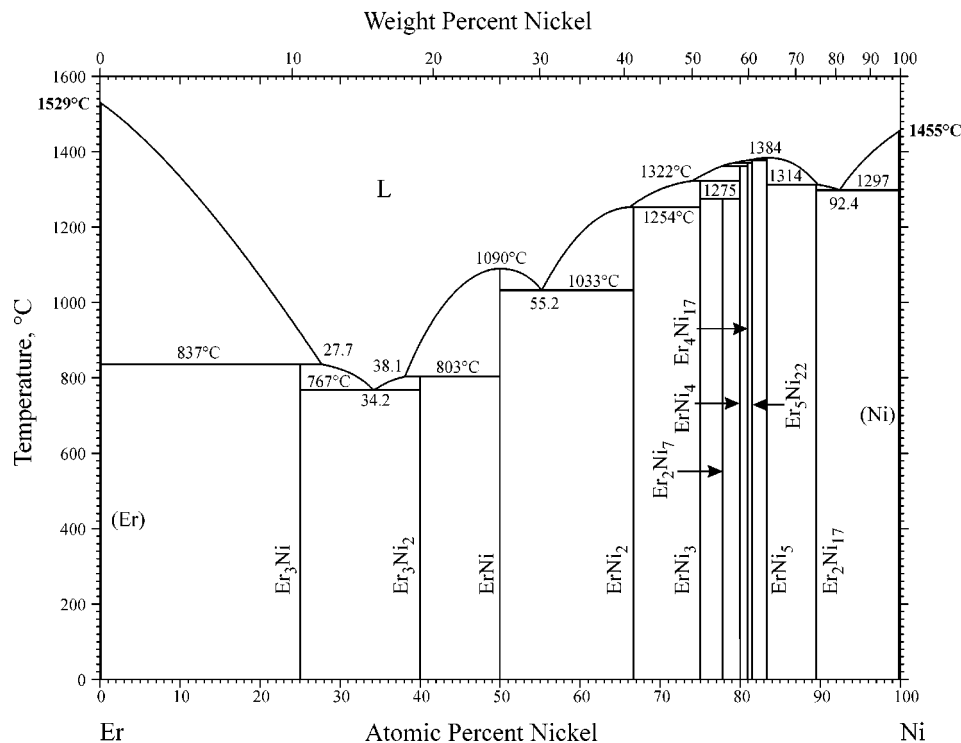


Fig. 1 Er-Ni phase diagram

Table 1 Er-Ni crystal structure data

Phase	Composition, at.% Ni	Pearson symbol	Space group	Strukturbericht designation	Prototype
(Er)	0	<i>hP2</i>	<i>P6₃/mmc</i>	<i>A3</i>	Mg
Er ₃ Ni	25	<i>oP16</i>	<i>Pnma</i>	<i>D0₁₁</i>	Fe ₃ C
Er ₃ Ni ₂	40	<i>hR15</i>	<i>R$\bar{3}$</i>	...	...
ErNi	50	<i>oP8</i>	<i>Pnma</i>	<i>B27</i>	FeB
ErNi ₂	66.7	<i>cF24</i>	<i>Fd$\bar{3}m$</i>	<i>C15</i>	Cu ₂ Mg
ErNi ₃	75	<i>hR12</i>	<i>R$\bar{3}m$</i>	...	Ni ₃ Pu
Er ₂ Ni ₇	77.8	<i>hR54</i>	<i>R$\bar{3}m$</i>	...	Co ₇ Gd ₂
ErNi ₄	80	<i>mC30</i>	<i>C2/m</i>	...	Ni ₄ Pu
Er ₄ Ni ₁₇	81	...	...	...	...
Er ₅ Ni ₂₂	81.5	...	...	...	...
ErNi ₅	83.3	<i>hP6</i>	<i>P6/mmm</i>	<i>D2_d</i>	CaCu ₅
Er ₂ Ni ₁₇	89.5	<i>hP38</i>	<i>P6₃/mmc</i>	...	Ni ₁₇ Th ₂
(Ni)	100	<i>cF4</i>	<i>Fm$\bar{3}m$</i>	<i>A1</i>	Cu