

Au – Er (Gold – Erbium)

Phase diagram

On the basis of thermodynamic calculations, Gschneidner et al. [92 Gsc] have established the phase equilibria (Fig. 1). In an enlarged version phase equilibria for concentrations < 10 at% Er are given in Fig. 2.

Crystal structure

Structure and lattice parameters of intermediate phases are collected in Table 1.

Table 1. Au–Er. Crystallographic data of intermediate phases taken from [Massalski] and [Pearson].

Phase	Concentration [at% Au]	Structure	Prototype	Lattice parameters [nm]			Reference
				<i>a</i>	<i>b</i>	<i>c</i>	
AuEr ₂	33.3	ort	Co ₂ Si	0.6996	0.48694	0.8802	[71 McM]
α-AuEr	50	ort	CrB	0.365	1.081	0.458	[71 McM]
β-AuEr	50	cub	CsCl	0.35346		0.8920	[71 McM]
Au ₂ Er	66.7	tet	MoSi ₂	0.3662		0.5079	[67 Dwi]
Au ₃ Er	75	ort	Cu ₃ Ti	0.6029	0.4949		[68 Sad]
Au ₄ Er	80	tet	MoNi ₄	0.6639		0.41575	[71 McM]

Lattice parameters of (Au) solid solutions as a function of concentration are shown in Fig. 3 [00 Alq].

Thermodynamics

Using an EMF method with CoF₂ solid electrolyte, Alqasmi et al. [00 Alq] have determined thermodynamic properties of Au-Er alloys. Thermodynamic activities ($\log a_{\text{Er}}^{\text{S}}$) of solid alloys are plotted in Fig. 4. Enthalpies of formation of intermediate compounds ΔH^{S} , are given in Table 2.

Table 2. Au–Er. Enthalpies of formation of intermediate phases in the Au-Er system [00 Alq].

Phase	ΔH^{S} [kJ g-atom ⁻¹]
Au ₄ Er	- 52.48
Au ₃ Er	- 60.78
Au ₂ Er	- 77.46
AuEr	- 110.58
AuEr ₂	- 87.98

Figures

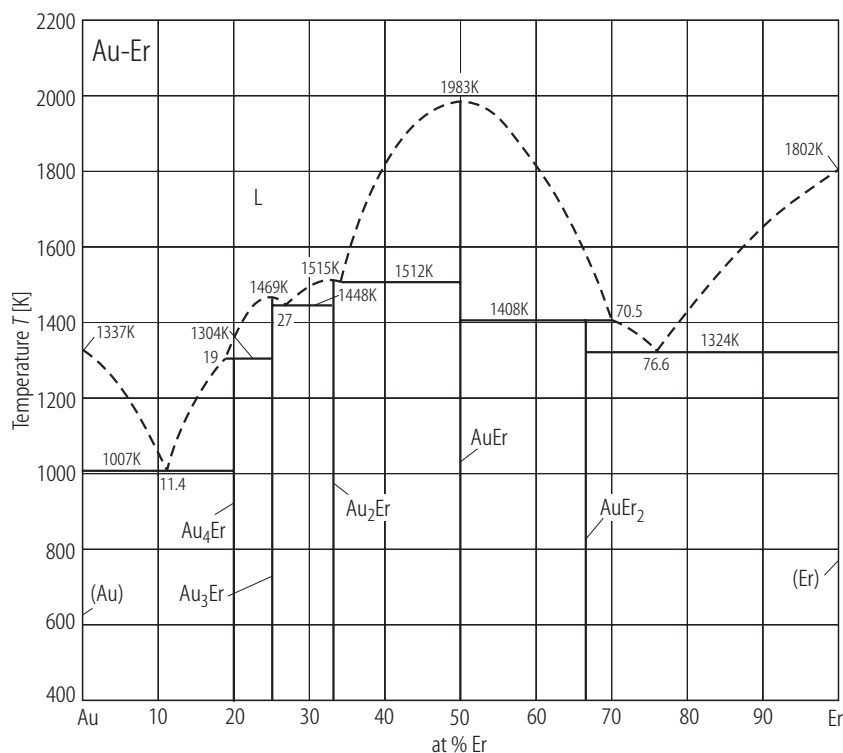


Fig. 1. Au–Er. Phase diagram [Massalski], [92 Gsc].

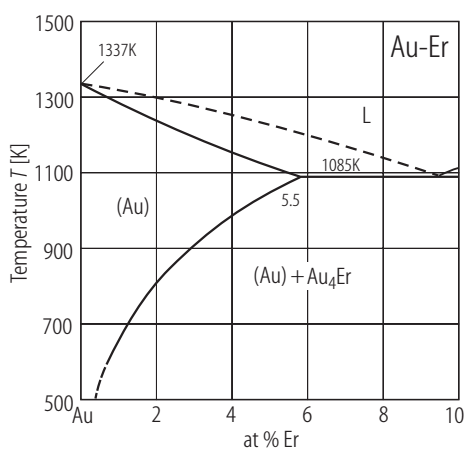


Fig. 2. Au–Er. Au-rich part of the phase diagram [Massalski], [92 Gsc].

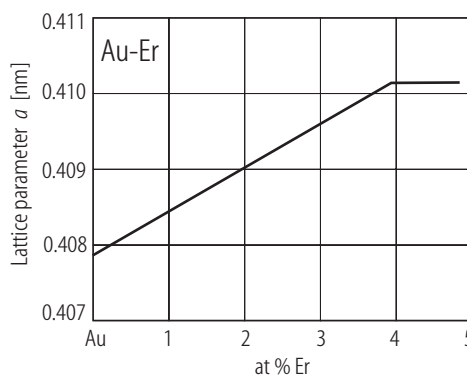


Fig. 3. Au–Er. Lattice spacing of (Au) solid solutions [00 Alq].

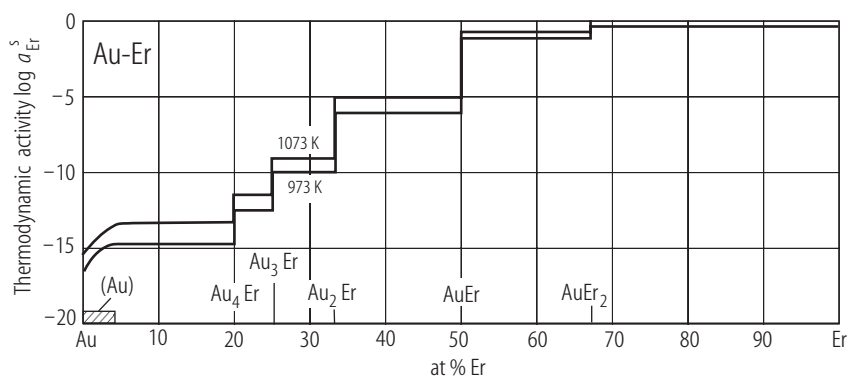


Fig. 4. Au–Er. Thermodynamic activities determined by [00 Alq].

References

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