Gd-Sm (Gadolinium-Samarium)

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The Gd-Sm phase diagram in [Massalski2] was redrawn from [1983Gsc]. The two two-phase fields, $L + (\beta\text{Gd}, \gamma\text{Sm})$ and $(\beta\text{Gd}, \gamma\text{Sm}) + (\alpha\text{Gd}, \beta\text{Sm})$, are so narrow that they were shown with straight lines. The (αSm) phase field was drawn vertically at (0 °C, 60 at.% Sm) and smoothly connected to the $\beta\text{Sm}/\alpha\text{Sm}$ transition temperature (734 °C) at 100 at.% Sm. This is based on the literature data that the maximum solubility of Gd in (αSm) is 40 at.%.

Figure 1 shows the Gd-Sm phase diagram calculated by [2010Guo]. The narrow two-phase fields shown by [1983Gsc] could be reproduced, but the shape of the (αSm) phase field appeared differently. The shape shown in

Fig. 1 is preferred because it is based on thermodynamics. Because there are no reliable experimental data, the trend of the (αSm) phase boundary is still tentative.

References

- 1983Gsc:** K.A. Gschneidner, Jr. and F.W. Calderwood, The Gd-Sm (Gadolinium-Samarium) System, *Bull. Alloy Phase Diagr.*, 1983, **4**(2), p 164-167
- 2010Guo:** C. Guo, Z. Du, and C. Li, A Thermodynamic Description of the Gd-Mg-Sm System, *Calphad*, 2010, **34**, p 90-97

Fig. 1 Gd-Sm phase diagram