

Gd-Mn (Gadolinium-Manganese)

H. Okamoto

The Gd-Mn phase diagram in [Massalski2] (solid lines in Fig. 1) was adopted from [Shunk]. An almost identical phase diagram was reported later by Kirchmayr and Lugscheider [1967Kir].

Dashed lines in Fig. 1 show the Gd-Mn phase diagram obtained by Gröbner et al. [2001Gro] by thermodynamic optimization. Because the experimental phase boundary data used as the basis of the thermodynamic modeling were adopted from Kirchmayr and Lugscheider [1967Kir], the diagram of Gröbner et al. [2001Gro] is similar to that of [Massalski2]. The most significant difference is observed along the (β Gd) and (α Gd) liquidus boundaries. The slope of the liquidus at 0 at.% Mn is governed by the heat of fusion of Gd, and the slopes as shown by [Massalski2] is apparently too flat according to the criterion of [1991Oka]. If the flat liquidus is real, the (β Gd) and (α Gd) phases must

have substantial width almost corresponding to the difference between [Massalski2] and [2001Gro] liquidus boundaries. However, because no solubility or only very limited solubility of Mn in rare earth elements was reported for other rare earth-manganese systems, it is likely that the solubility of Mn in Gd, particularly in the dominant α Gd, is also small. Therefore, the diagram of Gröbner et al. [2001Gro] may be better. (See also "Mn-Y" in this issue.)

References

- 1967Kir:** H.R. Kirchmayr and W. Lugscheider: *Z. Metallkd.*, 1967, 58(3), pp. 185-88 (in German).
1991Oka: H. Okamoto and T.B. Massalski: *J. Phase Equilibria*, 1991, 12(2), pp. 148-68.
2001Gro: J. Gröbner, A. Pisch, and R. Schmid-Fetzer: *J. Alloys Compds.*, 2001, 317-318, pp. 433-37.

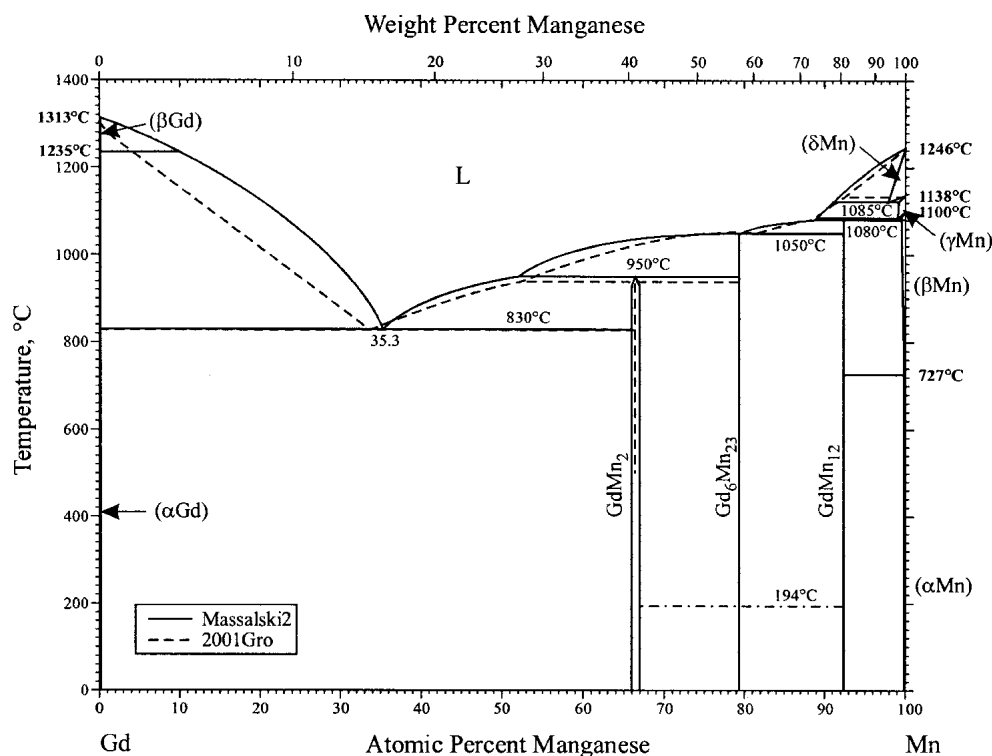


Fig. 1 Gd-Mn phase diagram