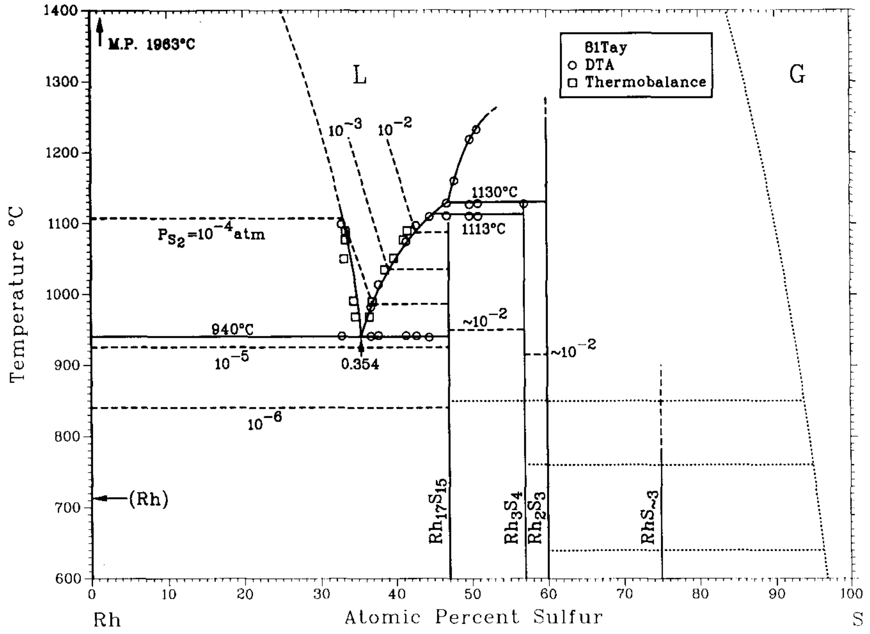

Fig.1 Rh-S phase diagram.

on heating. [81Tay] determined the Rh-S phase diagram (0 to 60 at.% S) by DTA and the thermobalance method under pressures sufficiently high to suppress boiling of the compounds (Fig. 1). [81Tay] observed the L ↔ (Rh) + $Rh_{17}S_{15}$ eutectic point at 35.4 and 940 °C, whereas [71Zwi] observed it at 37.5 at.% S and 925 °C.

Cited References

35Juz: R. Juza, O. Hulsmann, and K. Meisel, *Z. Anorg. Allg. Chem.*, *225*, 369-385 (1935) in German.

37Bil: W. Biltz, *Z. Anorg. Allg. Chem.*, *233*, 282 (1937) in German.

71Zwi: G. Zwingmann and E.M. Wenzel, *Metall*, *25*, 1121-1123 (1971) in German.

81Tay: J.R. Taylor, *Metall. Trans. B*, *12*, 47-54 (1981).

U-Zr (Uranium-Zirconium)

H. Okamoto

The U-Zr phase diagram in [Massalski2] was adopted from [89She]. According to [91Oka2], the initial slope of (γU,βZr)/[(γU,βZr) + (αZr)] was too flat, considering that the solid solubility of U in (αZr) is small and that the enthalpy of βZr/Zr transformation is small (~4 kJ/mol). The (γU,βZr)/[(U,βZr) + (βU)] boundary also showed the same difficulty. In this regard, the phase diagram calculated by [91Oga] (Fig. 1) is thermodynamically more appropriate. [91Oga] used the phase diagram of [89She] as the primary input data. However, the excess Gibbs energies of the liquid and the bcc phases obtained by [91Oga] included enthalpy and excess entropy parts with unusual magnitudes [91Oka1]. This problem is caused by the existence of a miscibility gap (positive enthalpy of mixing is required) in the solid phase at temperatures not much below the liquidus and solidus boundaries that appear to require negative enthalpies of mixing for both liquid and solid phases. The difficulty in thermodynamic modeling may indicate that the entire phase boundaries of this system must be reexamined experimentally.

Cited References

89She: R.I. Sheldon and D.E. Peterson, *Bull. Alloy Phase Diagrams*, *10*(2), 165-171 (1989).

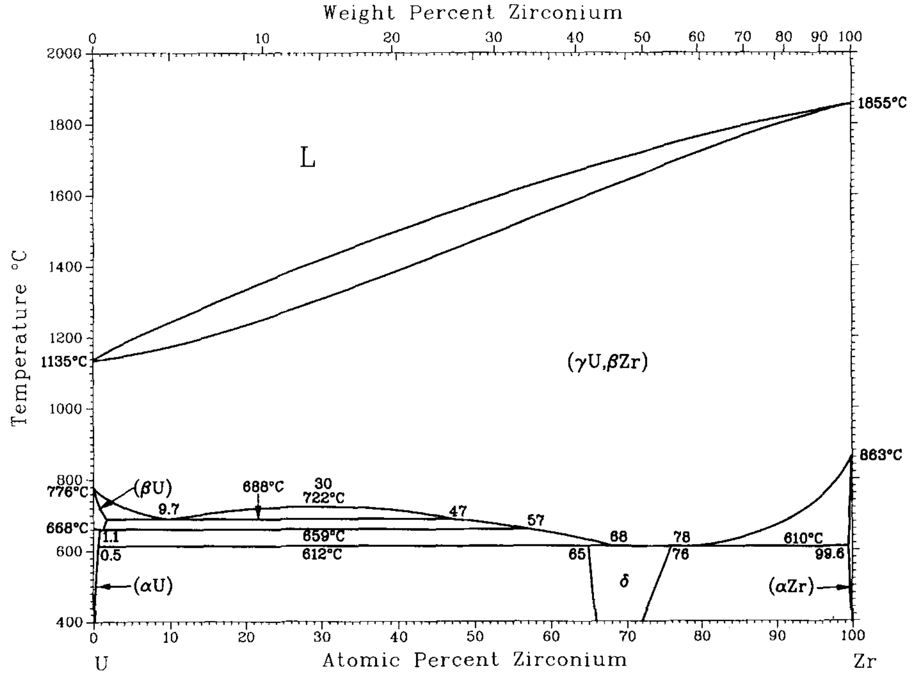

Fig.1 Calculated U-Zr phase diagram.

91Oga: T. Ogawa and T. Iwai, *J. Less Common Met., 170,* 101-108 (1991).

91Oka1: H. Okamoto, *J. Phase Equil.*, *12* (6), 623-643 (1991).

91Oka2: H. Okamoto and T.B. Massalski, *J. Phase Equil., 12*(2), 148-168 (1991).