

# Al-Au (Aluminum-Gold)

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The Al-Au phase diagram in [Massalski2], which was adapted from [1987Mur], was updated by [1991Oka1] (solid lines in Fig. 1) based on new data.

[2004Liu] and then [2004Li] attempted to assess the Al-Au system thermodynamically. The optimized phase diagrams are shown in Fig. 2 [2004Liu] and Fig. 3 [2004Li]. Figures 4 and 5 are enlarged sections of Fig. 3. For comparison, the liquidus and the  $\beta$  phase boundary of [2004Liu] and [2004Li] are shown with dashed lines and chain lines, respectively, in Fig. 1. Disagreement between [1991Oka1] and [2004Liu] is noticeable along the Al-rich side of the  $\text{Al}_2\text{Au}$  liquidus and in the location of the  $\beta$  phase. Numerous experimental data points (see [1987Mur]) appear to support the  $\text{Al}_2\text{Au}$  liquidus shown by [1991Oka1] or [2004Li]. [2004Liu] assumed that the  $\text{AlAu}_2$  phase is a line compound (Fig. 2), whereas [1987Mur] showed three polymorphic forms (Fig. 1). The detailed configuration in this range was taken into account in the thermodynamic model of [2004Li] (Fig. 4). However, because the coexistence of two phases in a wide temperature range separated by a narrow two-phase

field is unlikely [1991Oka2], the relationship between  $\alpha\text{AlAu}_2$  and  $\beta\text{AlAu}_2$ , as shown by [1991Oka1] or [2004Li], is doubtful. Further clarification is needed with regard to the questionable points described above.

## References

- 1987Mur:** J.L. Muray, H. Okamoto, and T.B. Massalski, The Al-Au (Aluminum-Gold) System, *Bull. Alloy Phase Diagrams*, Vol 8 (No. 1), 1987, p 20-29
- 1991Oka1:** H. Okamoto, Al-Au (Aluminum-Gold), *J. Phase Equilib.*, Vol 12 (No. 1), 1991, p 114-115
- 1991Oka2:** H. Okamoto and T.B. Massalski, Thermodynamically Improbable Phase Diagrams, *J. Phase Equilib.*, Vol 12 (No. 2), 1991, p 148-168
- 2004Li:** M. Li, C. Li, F. Wang, D. Luo, and W. Zhang, Thermodynamic Assessment of the Al-Au System, *J. Alloys Compd.*, Vol 385, 2004, p 199-206
- 2004Liu:** H.S. Liu, J. Wang, Y. Du, and Z.P. Jin, Thermodynamic Description of the Au-Al System, *Z. Metallkd.*, Vol 95 (No. 1), 2004, p 45-49

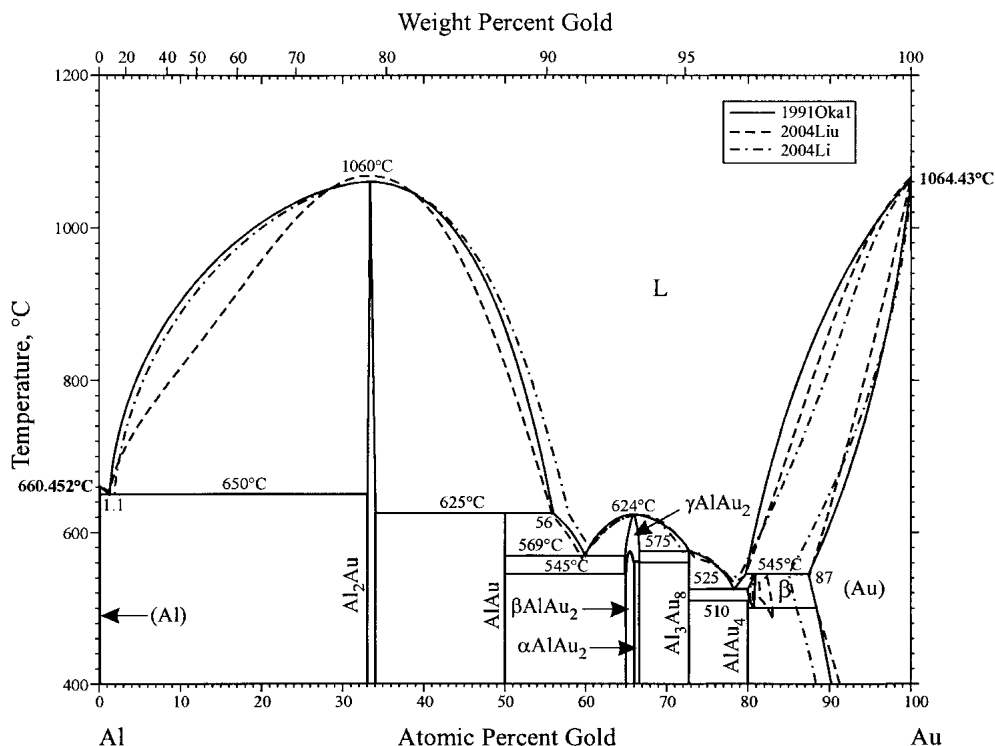


Fig. 1 Comparison of the Al-Au phase diagram reported by [1991Oka1], [2004Liu], and [2004Li]

Section III: Supplemental Literature Review

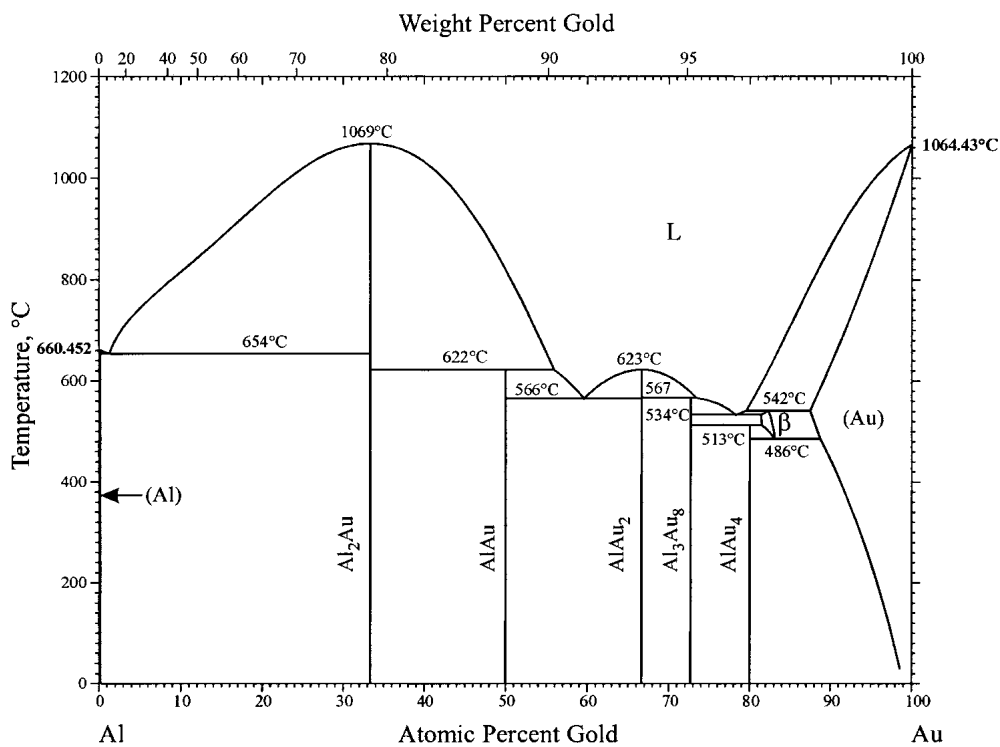


Fig. 2 Calculated Al-Au phase diagram [2004Liu]

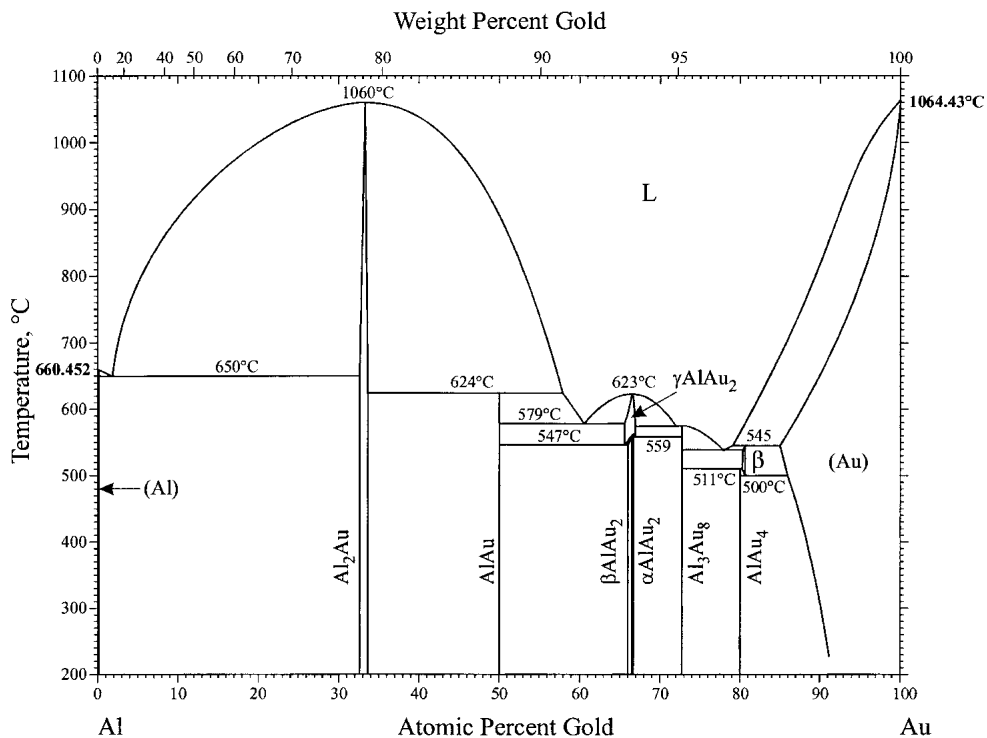


Fig. 3 Calculated Al-Au phase diagram [2004Li]

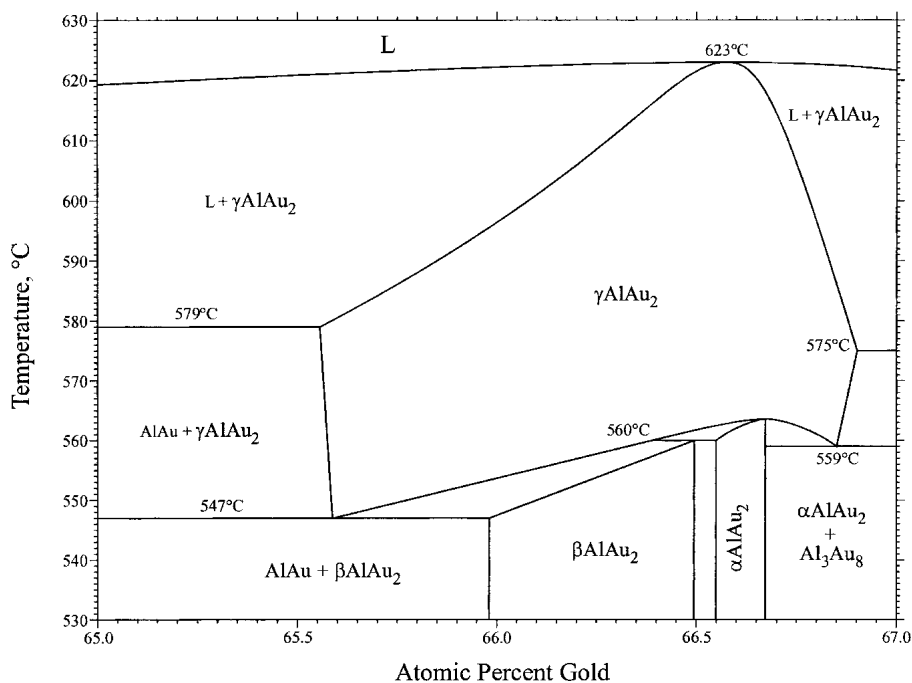


Fig. 4 Enlarged section of Fig. 3 (65–67 at.% Au)

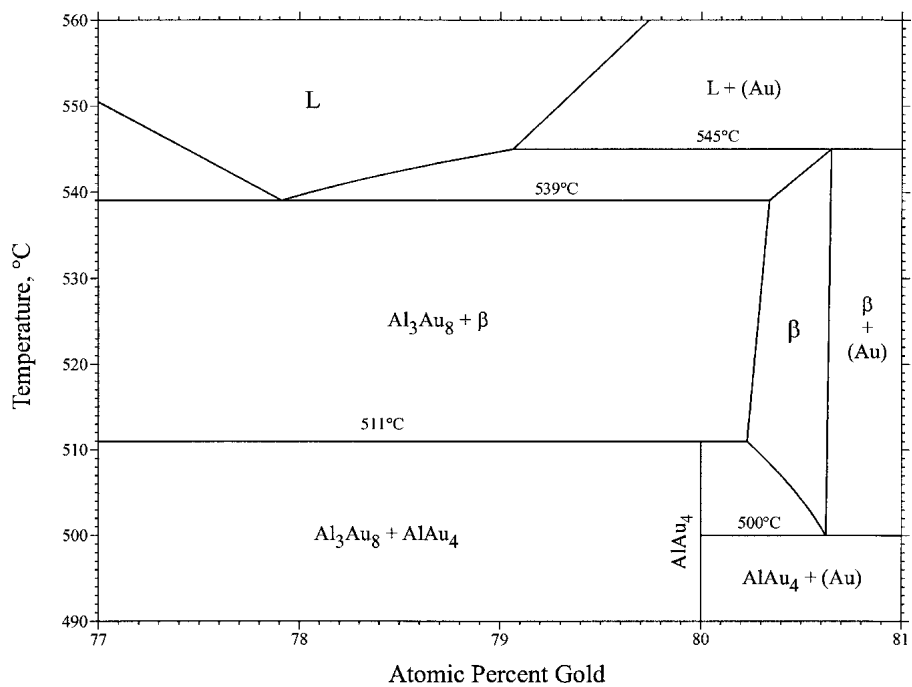


Fig. 5 Enlarged section of Fig. 3 (77–81 at.% Au)