

Ga-U (Gallium-Uranium)

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The Ga-U phase diagram in [Massalski2] was updated by [1993Oka] based on [1992Gar]. Three phases, Ga_3U , $\beta\text{Ga}_2\text{U}$, and Ga_3U_2 , were shown as stable phases. In addition, [1993Oka] showed Ga_5U_3 and GaU as possible stable phases. However, because crystal structures of Ga_5U_3 , Ga_3U_2 , and GaU were reported to be the same, it was speculated that only one of these phases is the true equilibrium phase.

[2007Sal] investigated uranium-rich Ga-U alloys by means of metallography, x-ray diffraction, and DTA. It was found that (βU) and (αU) are in equilibrium with Ga_5U_3 . Figure 1 shows the Ga-U phase diagram of [1993Oka] modified based on the work of [2007Sal].

Table 1 shows Ga-U crystal structure data.

Table 1 Ga-U crystal structure data

Phase	Composition, at.% U	Pearson symbol	Space group	Strukturbericht designation	Prototype
(Ga)	0	<i>oC8</i>	<i>Cmca</i>	<i>A11</i>	Ga
Ga_3U	25	<i>cP4</i>	<i>Pm\bar{3}m</i>	<i>L1_2</i>	AuCu_3
$\beta\text{Ga}_2\text{U}$	33.3	<i>hP3</i>	<i>P6/mmm</i>	<i>C32</i>	AlB_2
$\alpha\text{Ga}_2\text{U(a)}$	33.3	<i>oC*</i>	<i>Cmmm</i>
Ga_5U_3	37.5	<i>oC32</i>	<i>Cmcm</i>
(γU)	90-100	<i>cI2</i>	<i>Im\bar{3}m</i>	<i>A2</i>	W
(βU)	98.7-100	<i>tP30</i>	<i>P4_2/mnm</i>	<i>A_b</i>	βU
(αU)	100	<i>oC4</i>	<i>Cmcm</i>	<i>A20</i>	αU

(a) Stable below -148°C [1993Oka]

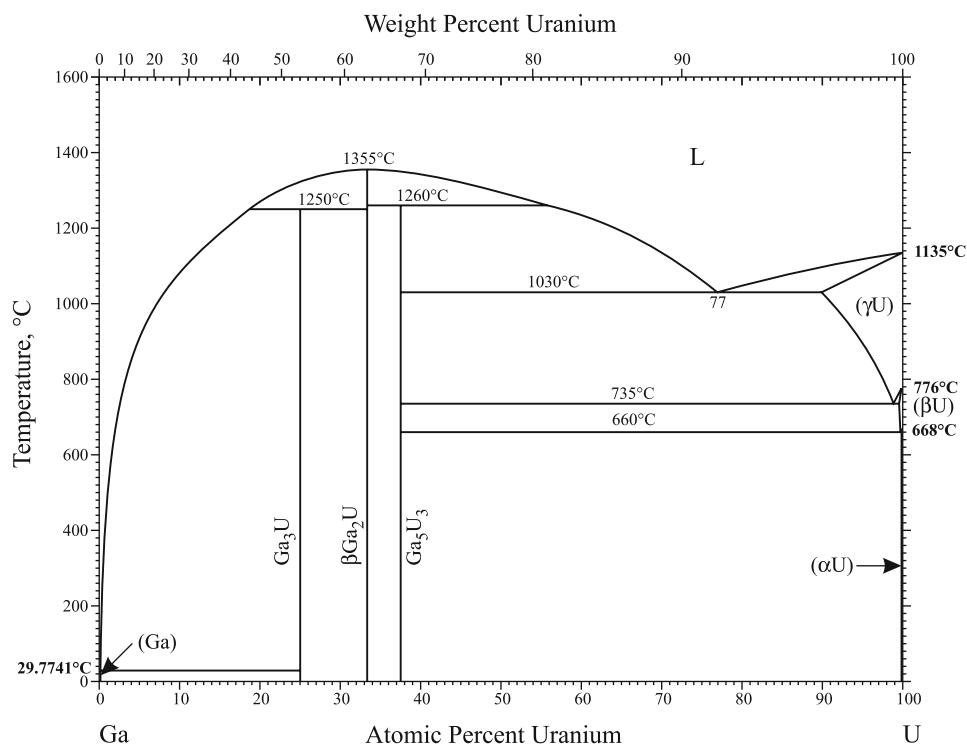


Fig. 1 Ga-U phase diagram

References

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