

Cu-Zr (Copper-Zirconium)

H. Okamoto

The Cu-Zr phase diagram in [Massalski2] was redrawn from [1990Ari]. Six intermediate phases (Cu_9Zr_2 , $\text{Cu}_{51}\text{Zr}_{14}$, Cu_8Zr_3 , $\text{Cu}_{10}\text{Zr}_7$, CuZr , CuZr_2) were known to exist.

However, the existence of more intermediate phases was reported by [1986Kel] and [1998Bra]. [2006Wan] assessed the Cu-Zr system including these additional phases.

Table 1 Cu-Zr crystal structure data

Phase	Composition, at.% Zr	Pearson symbol	Space group	Struktur bericht designation	Prototype
(Cu)	0	<i>cF4</i>	<i>Fm$\bar{3}m$</i>	A1	Cu
Cu_9Zr_2	18.2	...	...	...	...
$\text{Cu}_{51}\text{Zr}_{14}$	21.5	<i>hP65</i>	<i>P6/m</i>	...	$\text{Ag}_{51}\text{Gd}_{14}$
Cu_8Zr_3	27.3	<i>oP44</i>	<i>Pnma</i>	...	Cu_8Hf_3
Cu_2Zr	33.3	...	...	...	...
$\text{Cu}_{24}\text{Zr}_{13}$	35.1	<i>o*37</i>	...	...	...
$\text{Cu}_{10}\text{Zr}_7$	41.2	<i>oC68</i>	<i>C2ca</i>	...	$\text{Ni}_{10}\text{Zr}_7$
CuZr	50	<i>cP2</i>	<i>Pm$\bar{3}m$</i>	B2	CsCl
Cu_5Zr_8	61.5	<i>o*26</i>	...	...	...
βCuZr_2	66.7	<i>tI6</i>	<i>I4/mmm</i>	C11 _b	MoSi_2
αCuZr_2	66.7	<i>tP150</i>	...	...	...
(βZr)	95.3-100	<i>cI2</i>	<i>Im$\bar{3}m$</i>	A2	W
(αZr)	100	<i>hP2</i>	<i>P6$_3$/mmc</i>	A3	Mg

Figure 1 shows the Cu-Zr phase diagram calculated by [2006Wan] (< 1227 °C). Cu-Zr crystal structure data given in Table 1 were taken from [1990Ari] and [Pearson3].

[1994Zen] and [2006He] also attempted thermodynamic modeling of this system, but they were based on the older phase diagram of [1990Ari] with fewer intermediate compounds.

References

- 1986Kel:** E. Kneller, Y. Khan, and U. Gorres, The Alloy System, Copper-Zinc, *Z. Metallkd.*, 1986, **77**(8), p 43-48
- 1990Ari:** D. Arias and J.P. Abriata, The Cu-Zr (Copper-Zirconium) System, *Bull. Alloy Phase Diagrams*, 1990, **11**(5), p 452-459
- 1994Zen:** K.J. Zeng, M. Hämmäläinen, and H.L. Lukas, A New Thermodynamic Description of the Cu-Zr System, *J. Phase Equilibria*, 1994, **15**(6), p 577-586
- 1998Bra:** M.H. Braga, L.F. Malheiros, F. Castro, and D. Soares, Experimental Liquidus Points and Invariant Reactions in the Cu-Zr system, *Z. Metallkd.*, 1998, **89**(8), p 541-545
- 2006He:** X.C. He, H. Wang, H.S. Liu, and Z.P. Jin, Thermodynamic Description of the Cu-Ag-Zr System, *Calphad*, 2006, **30**, p 367-374
- 2006Wan:** N. Wang, C. Li, Z. Du, F. Wang, and W. Zhan, The Thermodynamic Re-assessment of the Cu-Zr System, *Calphad*, 2006, **30**, p 461-469

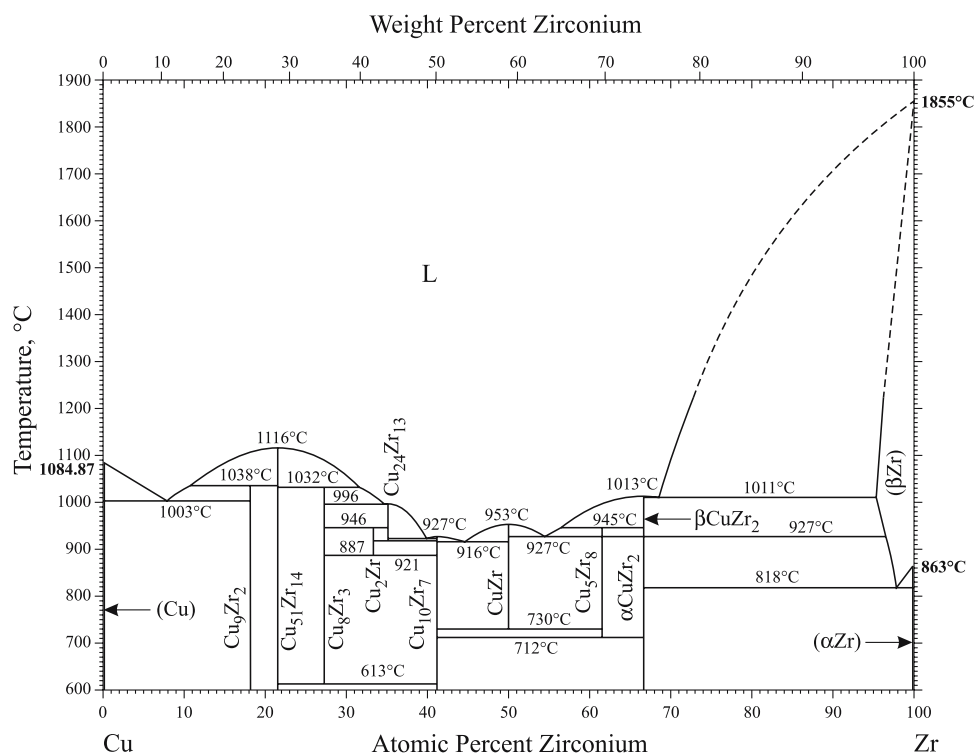


Fig. 1 Cu-Zr phase diagram