JPEDAV (2012) 33:417–418
DOI: 10.1007/s11669-012-0077-1
1547-7037 ©ASM International

Cu-Zr (Copper-Zirconium)

H. Okamoto

The Cu-Zr phase diagram in [Massalski2] was updated by [2008Oka] by showing the phase diagram calculated by [2006Wan]. Four phases (Cu_2Zr, $Cu_{24}Zr_{13}$, Cu_5Zr_8, $\beta CuZr_2$) were added to the six intermediate phases (Cu_9Zr_2, $Cu_{51}Zr_{14}$, Cu_8Zr_3, $Cu_{10}Zr_7$, CuZr, $\alpha CuZr_2$) already known in [Massalski2].

After [2006Wan], the Cu-Zr phase diagram was thermodynamically assessed by [2008Tur], [2008Yam], [2010Kan], [2010Zho], and [2011Gie]. Among these, the phase diagrams of [2010Kan] and [2011Gie] are similar. All the others are very different particularly with regard to the eutectoidal decomposition temperatures of some intermediate phase. The result of [2010Zho] is tentatively shown in Fig. 1 because some experiments have been carried out to examine the eutectoidal decomposition. Major differences between the two most recent works, [2010Zho] and [2011Gie], are: (1) Cu_5Zr in [2010Zho] is Cu_9Zr_2 in [2011Gie] and (2) $Cu_{51}Zr_{14}$ is stable down to 0 K in [2010Zho] whereas it decomposes eutectoidaly at 534 °C according to [2011Gie]. For the latter point, the result of [2011Gie] seems to be more reasonable because $Cu_{51}Zr_{14}$ with a complex crystal structure gives increasingly negative contribution to the entropy term of the Gibbs energy as the temperature increases. [2010Zho] and [2011Gie] agree that Cu_5Zr_8, which was shown in the phase diagram of [2006Wan], does not exist in the stable state.

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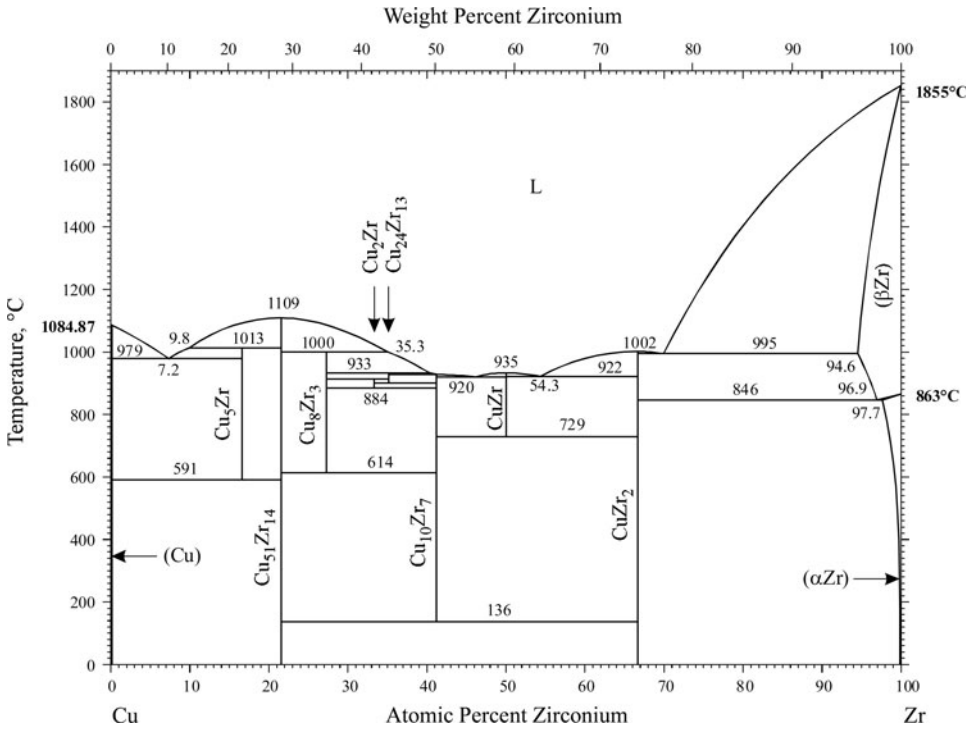

Fig. 1 Cu-Zr phase diagram

Section III: Supplemental Literature Review

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