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Ti-Zn (Titanium-Zinc)

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The Ti-Zn phase diagram in [Massalski2] was redrawn from [1987Mur]. The existence of seven intermediate compounds (Ti_2Zn, TiZn, $TiZn_2$, $TiZn_3$, $TiZn_5$, $TiZn_{10}$, $TiZn_{15}$) was known, but liquidus boundaries were totally unknown.

[2004Vas] showed a complete Ti-Zn phase diagram by quoting [1987Mur] and [2003Ono]. $TiZn_{15}$ was replaced by $TiZn_{16}$ for which the crystal structure is known. [2004Vas] showed another incomplete Ti-Zn phase diagram with additional phases Ti_2Zn_3, $TiZn_7$, and $TiZn_8$ based on literature data with reservations about the existence of Ti_2Zn_3, $TiZn_5$, and $TiZn_{10}$.

The Ti-Zn diagram of [2003Ono] was apparently superseded by the thermodynamically calculated diagram of [2006Doi] (same authors). Figure 1 shows the diagram of [2006Doi] with $TiZn_{15}$ replaced by $TiZn_{16}$. This diagram does not include Ti_2Zn_3, $TiZn_7$, and $TiZn_8$ in the second diagram of [2004Vas]. Ti_2Zn_3 is probably $TiZn_3$ [2004Vas]. Crystal structures of $TiZn_5$, $TiZn_7$, $TiZn_8$ and $TiZn_{10}$ are unknown and their existence must be confirmed. Table 1 shows Ti-Zn crystal structure data.

Table 1 Ti-Zn crystal structure data

Phase	Composition, at.% Zn	Pearson symbol	Space group	Strukturbericht designation	Prototype
(βTi)	0 to 31	*cI*2	$Im\bar{3}m$	*A*2	W
(αTi)	0	*hP*2	$P6_3/mmc$	*A*3	Mg
Ti_2Zn	33.3	*tI*6	I4/*mmm*	$C11_b$	$MoSi_2$
TiZn	50	*cP*2	$Pm\bar{3}m$	*B*2	CsCl
$TiZn_2$	66.7	*hP*12	$P6_3/mmc$	*C*14	$MgZn_2$
$TiZn_3$	75	*cP*4	$Pm\bar{3}m$	$L1_2$	$AuCu_3$
$TiZn_5$	83.3	···	···	···	···
$TiZn_7$(a)	87.5	···	···	···	···
$TiZn_8$(a)	88.9	···	···	···	···
$TiZn_{10}$	90.9	···	···	···	···
$TiZn_{16}$	94.1	*oC*68	*Cmcm*	···	···
(Zn)	100	*hP*2	$P6_3/mmc$	*A*3	Mg

(a) Not shown in Fig. 1.

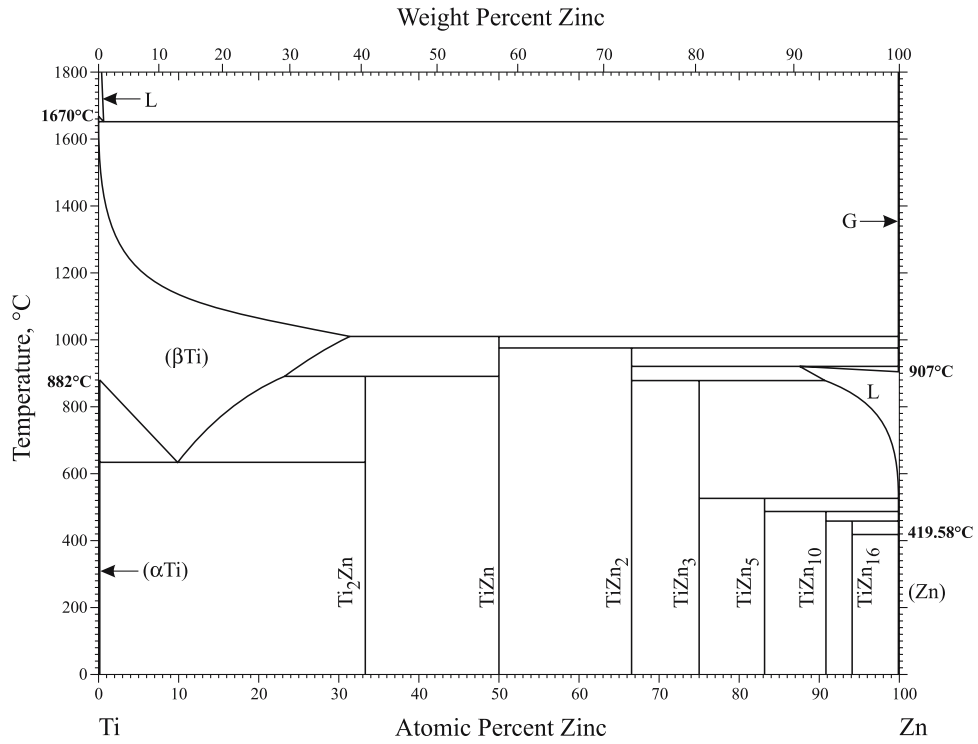

Fig. 1 Ti-Zn phase diagram

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