

Sc-Sn (Scandium-Tin)

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The Sc-Sn phase diagram was unknown in [Massalski2]. A partial phase diagram (40 to 100 at.% Sn) was determined by [1995Pal], as reported by [1996Oka].

[2005Pod] determined the Sc-Sn phase diagram in the 0 to 60 at.% Sn range by means of DTA, metallography, and x-ray diffraction analysis. The overlapping range of [1995Pal] and [2005Pod] (40 to 60 at.% Sn) is inconsistent. Sc_6Sn_5 and ScSn exist in this range according to [1995Pal], whereas Sc_5Sn_4 and $\text{Sc}_{11}\text{Sn}_{10}$ exist correspondingly according to [2005Pod]. Figure 1 has been drawn by compromising

[1995Pal] and [2005Pod]. For the first compound, Sc_6Sn_5 , not Sc_5Sn_4 , has been accepted in Fig. 1 because its crystal structure was reported by [1995Pal]. For the second compound, $\text{Sc}_{11}\text{Sn}_{10}$ has been accepted because the crystal structure of ScSn could not be determined in spite of the simple equiatomic configuration.

Sc_5Sn_3 is polymorphic with the transformation temperature at 1715 °C [2005Pod]. The transition between (β Sc) and (α Sc) in Fig. 1 is speculative.

Table 1 shows Sc-Sn crystal structure data.

Table 1 Sc-Sn crystal structure data

Phase	Composition, at.% Sn	Pearson symbol	Space group	Strukturbericht designation	Prototype
(β Sc)	0-9	<i>cI2</i>	<i>Im$\bar{3}m$</i>	<i>A2</i>	W
(α Sc)	0-?	<i>hP2</i>	<i>P6$_3$/mmc</i>	<i>A3</i>	Mg
$\beta\text{Sc}_5\text{Sn}_3$	37.5	...	...	...	...
$\alpha\text{Sc}_5\text{Sn}_3$	37.5	<i>hP16</i>	<i>P6$_3$/mcm</i>	<i>D8$_8$</i>	Mn_5Si_3
Sc_6Sn_5	45.5	<i>oI44</i>	<i>Ibam</i>	...	Ti_6Ge_5
$\text{Sc}_{11}\text{Sn}_{10}$	47.6	...	...	...	...
ScSn ₂	66.7	<i>tI24</i>	<i>I4$_1$/amd</i>	...	...
(β Sn)	100	<i>tI4</i>	<i>I4$_1$/amd</i>	<i>A5</i>	β Sn
(α Sn)	100	<i>cF8</i>	<i>Fd$\bar{3}m$</i>	<i>A4</i>	C (diamond)

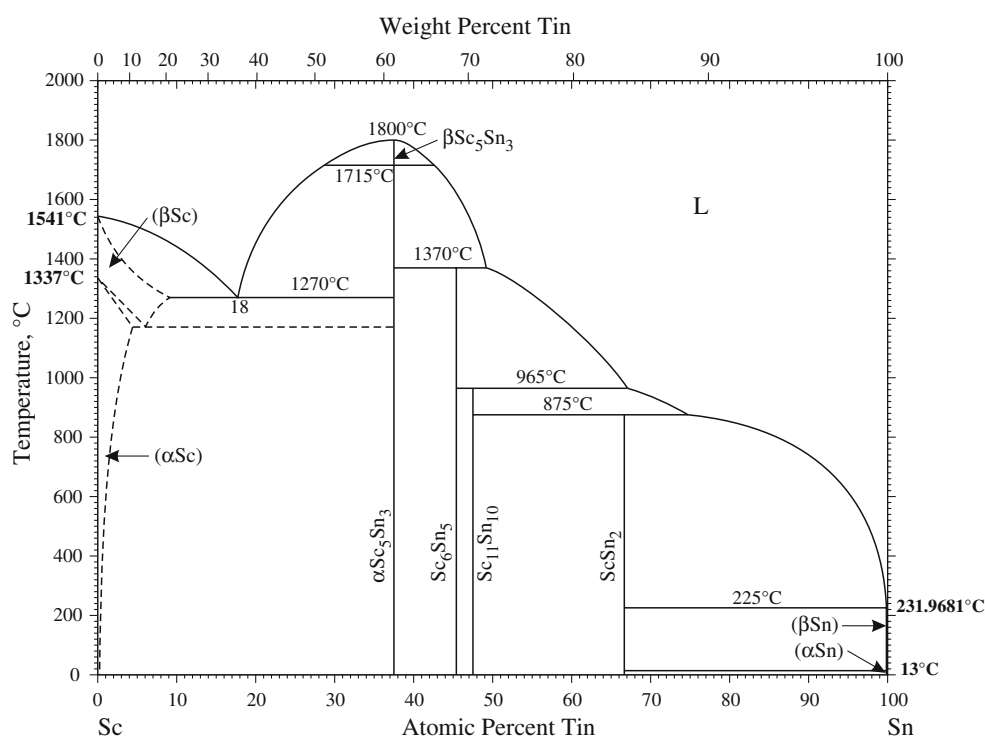


Fig. 1 Sc-Sn phase diagram

References

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- 1996Oka:** H. Okamoto, Sc-Sn (Scandium-Tin), *J. Phase Equilibria*, 1996, **17**(5), p 465
- 2005Pod:** O.V. Podarevskaya, V.G. Kudin, V.S. Zubchenko, and V.S. Sudavtsova, Phase Diagram of the Scandium-Tin System, *Powder Metall. Met. Ceram.*, 2005, **44**(9/10), p 463-466