JPEDAV (2006) 27:204
DOI: 10.1361/154770306X97768
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Si-Sr (Silicon-Strontium)

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The Si-Sr phase diagram in [Massalski2] was redrawn from [1989Itk]. Three intermediate compounds (Si_2Sr, SiSr, and $SiSr_2$) were shown. This phase diagram was reinvestigated by [2004Pal] in the range 25-100 at.% Sr by means of differential thermal analysis (DTA), metallography, x-ray diffraction, and electron microscopy. The result is shown in Fig. 1. Four intermediate phases were found to exist. Si_2Sr is dimorphic. The transition temperature was found at 590-690 °C by DTA (20 °C/min heating) or at 400-450 °C by high-temperature x-ray analysis (0.1 °C/min heating). The liquidus of βSi_2Sr is symmetric while the solidus is strongly asymmetric around the stoichiometric composition. This is thermodynamically unlikely. The thermal effect observed at ~1030 °C between βSi_2Sr and SiSr has not been accounted for.

Si-Sr crystal structure data shown in Table 1 were taken from [Massalski2] and [2004Pal].

References

1989Itk: V.P. Itkin and C.B. Alcock, The Si-Sr (Silicon-Strontium) System, *Bull. Alloy Phase Diagrams,* 1989, **10**(6), p 630-634

2004Pal: A. Palenzona and M. Pani, The Phase Diagram of the Sr-Si System, *J. Alloys Compds.,* 2004, **373,** p 214-219

Table 1 Si-Sr crystal structure data

Phase	Composition, at.% Sr	Pearson symbol	Space group	Strukturbericht designation	Prototype
(Si)	0	*cF*8	$Fd\bar{3}m$	*A*4	C (diamond)
βSi_2Sr	33.3–38	*tI*12	$I4_1/amd$	C_c	$ThSi_2$
αSi_2Sr	33.3	*cP*12	$P4_332$	…	…
SiSr	50	*oC*8	*Cmcm*	B_f	CrB
Si_3Sr_5	62.5	*tI*32	*I*4/*mcm*	$D8_l$	Cr_5B_3
$SiSr_2$	66.7	*oP*12	*Pnma*	*C*23	Co_2Si
(βSr)	100	*cI*2	$Im\bar{3}m$	*A*2	W
(αSr)	100	*cF*4	$Fm\bar{3}m$	*A*1	Cu

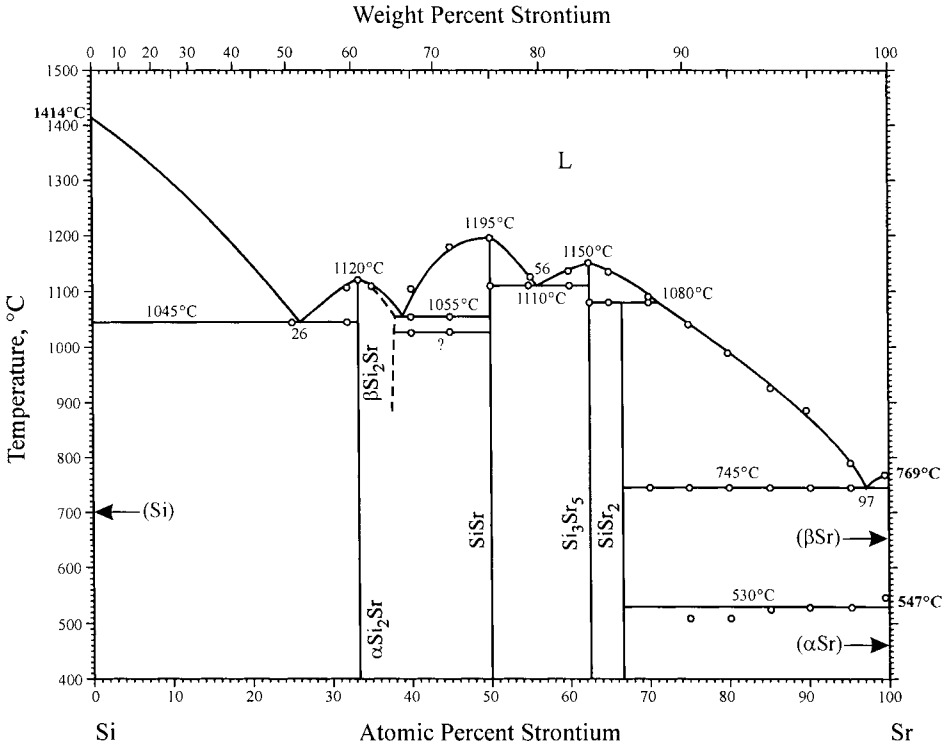

Fig. 1 Si-Sr phase diagram