

# In-Se (Indium-Selenium)

H. Okamoto

The experimental In-Se phase diagram in [Massalski2] was updated by [1998Oka] based on new information provided by [1995Sok].

[1998God] determined the In-Se phase diagram using differential thermal analysis, x-ray diffraction, optical microscopy, transmission electron microscopy, and scanning

electron microscopy. The result is outlined in Fig. 1 with dashed lines (only the liquidus is shown). [2003Li] assessed the In-Se system thermodynamically. The result is shown by solid lines in Fig. 1.

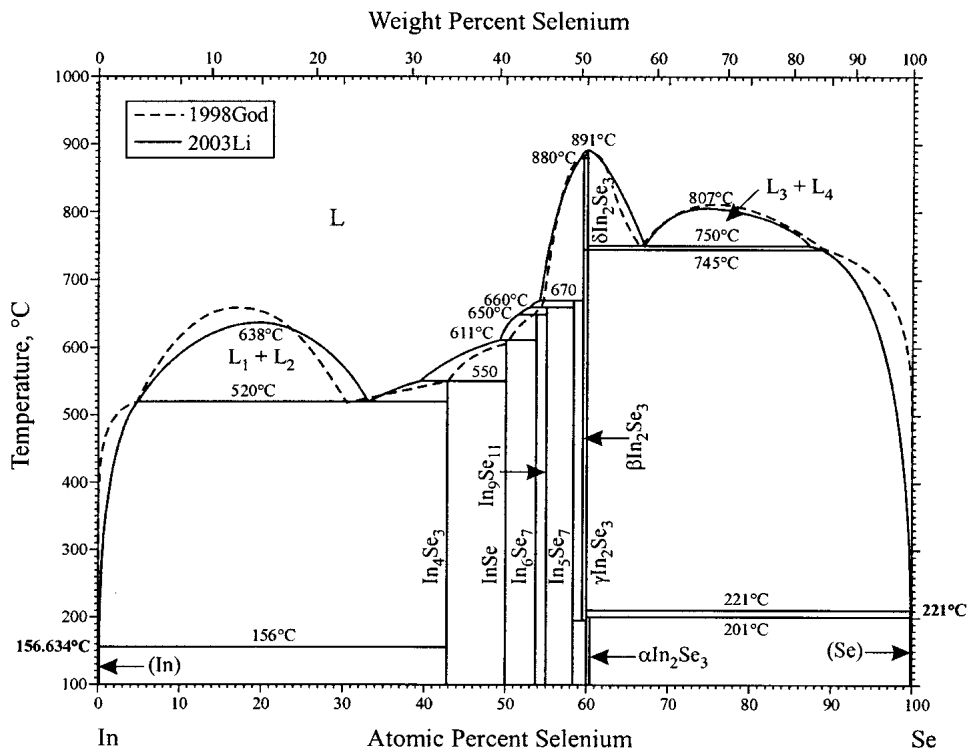
In-Se crystal structure data (Table 1) has been copied from [2000Oka].

**Table 1 In-se Crystal Structure Data**

Phase	Composition, at.% Se	Pearson Symbol	Space Group	Strukturbericht Designation	Proto-type
(In)	0	<i>t</i> 2	<i>I</i> 4/ <i>m</i> <i>m</i> <i>m</i>	A6	In
In <sub>4</sub> Se <sub>3</sub>	42.9	<i>o</i> P28	<i>P</i> <i>n</i> <i>m</i>	...	...
InSe	50	<i>h</i> R4	<i>R</i> $\bar{3}$ <i>m</i>	...	GaSe
In <sub>6</sub> Se <sub>7</sub>	53.8	<i>m</i> P26	<i>P</i> 2 <sub>1</sub> / <i>m</i>	...	In <sub>6</sub> S <sub>7</sub>
In <sub>9</sub> Se <sub>11</sub>	55	...	...	...	...
In <sub>5</sub> Se <sub>7</sub>	58.3	<i>c</i> *48	...	...	...
δIn <sub>2</sub> Se <sub>3</sub>	60	<i>h</i> P5	<i>P</i> 6 <sub>1</sub>	...	...
γIn <sub>2</sub> Se <sub>3</sub>	60	<i>h</i> P30	<i>P</i> 6 <sub>1</sub>	...	...
βIn <sub>2</sub> Se <sub>3</sub>	59.6	<i>h</i> R5	<i>R</i> $\bar{3}$ <i>m</i>	...	...
αIn <sub>2</sub> Se <sub>3</sub>	60.5	...	...	...	...
(Se)	100	<i>h</i> P3	<i>P</i> 3 <sub>1</sub> 21	A8	γSe

## References

- 1995Sok:** B.I. Sokolovskii, V.M. Sklyarchuk, V.P. Didoukh, and Yu.O. Plevachuk: "High Temperature and High Pressure Measurements of Electroconductivity and Thermopower for Cu<sub>2</sub>Se, Cu<sub>2</sub>Te, In-Se, In-Te Alloys," *High-Temp. Mater. Sci.*, 1995, 34, pp. 275-84.
- 1998God:** T. Gödecke, T. Haalboom, and F. Sommer: "Stable and Metastable Phase Equilibria of the In-Se System," *J. Phase Equilibria*, 1998, 19(6), pp. 572-76.
- 1998Oka:** H. Okamoto: "In-Se (Indium-Selenium)," *J. Phase Equilibria*, 1998, 19(4), p. 400.
- 2000Oka:** H. Okamoto: "In-Se" in *Desk Handbook, Phase Diagrams for Binary Alloys*, ASM International, Materials Park, OH, 490 (2000)
- 2003Li:** J.B. Li, M.C. Record, and J.C. Tedenac: "A Thermodynamic Assessment of the In-Se System," *Z. Metallkd.*, 2003, 94(4), pp. 381-89.



**Fig. 1** In-Se phase diagram