

# Cs-O (Cesium-Oxygen)

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The Cs-O partial phase diagram in [Massalski2] (0-25 at.% O) was redrawn from [1973Sim]. The phases Cs<sub>7</sub>O, Cs<sub>4</sub>O, Cs<sub>11</sub>O<sub>3</sub>, and Cs<sub>3</sub>O were shown in this phase diagram. In addition, the existence of Cs<sub>2</sub>O, CsO, Cs<sub>2</sub>O<sub>3</sub>,

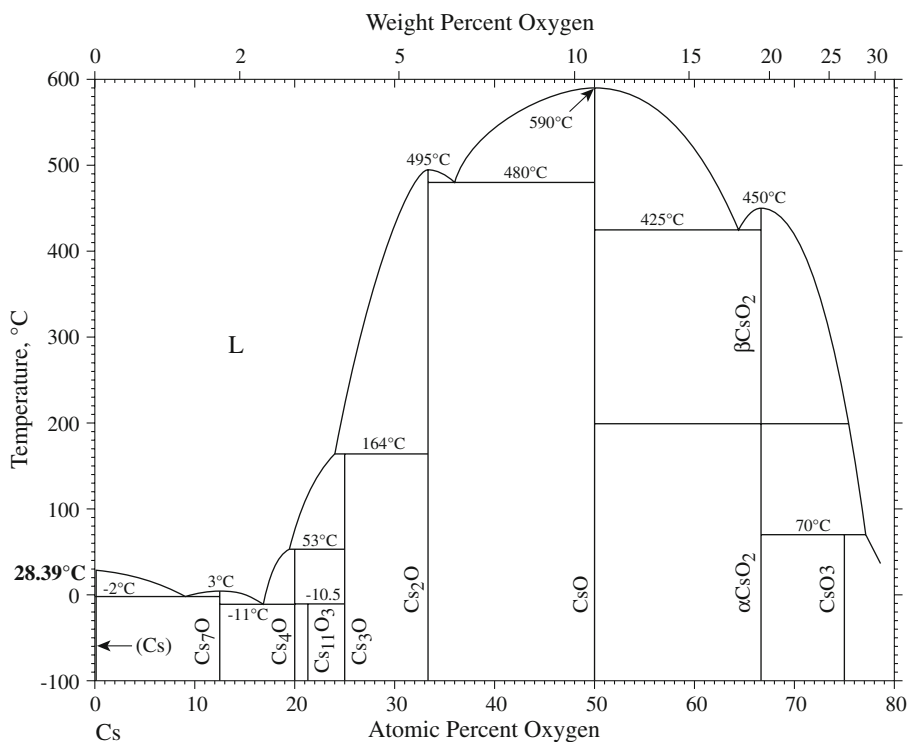
and CsO<sub>2</sub> (dimorphic) was shown in the crystal structure table.

[1979Kni] reported a more comprehensive phase diagram. Figure 1 shows the diagram of [1979Kni] with minor

**Table 1 Cs-O**

Phase	Composition, at.% O	Pearson symbol	Space group	Strukturbericht designation	Prototype
(Cs)	0	<i>cI2</i>	<i>Im</i> $\bar{3}m$	<i>A2</i>	W
Cs <sub>7</sub> O	12.5	<i>hP24</i>	<i>P</i> $\bar{6}m2$	...	...
Cs <sub>4</sub> O	20	<i>oP*</i>	<i>Pna2</i> <sub>1</sub>	...	...
Cs <sub>11</sub> O <sub>3</sub>	21.4	<i>mP56</i>	<i>P2</i> <sub>1</sub> / <i>c</i>	...	...
Cs <sub>3</sub> O	25	...	...	...	...
Cs <sub>2</sub> O	33.3	<i>hR3</i>	<i>R</i> $\bar{3}m$	...	N <sub>2</sub> W
CsO	50	<i>oI8</i>	<i>Immm</i>	...	...
Cs <sub>2</sub> O <sub>3</sub> (a)	60	<i>cI28</i>	<i>I</i> $\bar{4}3d$	<i>D7</i> <sub>3</sub>	Th <sub>3</sub> P <sub>4</sub>
βCsO <sub>2</sub>	66.7	<i>cF8</i>	<i>Fm</i> $\bar{3}m$	<i>B1</i>	NaCl
αCsO <sub>2</sub>	66.7	<i>tI6</i>	<i>I4/mmm</i>	<i>C11</i> <sub>a</sub>	CaC <sub>2</sub>
CsO <sub>3</sub>	75	...	...	...	...

(a) Not shown in Fig. 1



**Fig. 1** Cs-O phase diagram

modifications. Instead of  $\text{Cs}_{11}\text{O}_3$  in Fig. 1, [1979Kni] showed  $\text{Cs}_7\text{O}_2$ .  $\text{Cs}_{11}\text{O}_3$  was accepted in Fig. 1 because its crystal structure is known. According to [1973Sim],  $\text{Cs}_{11}\text{O}_3$  forms by a peritectic reaction at 52.5 °C, which appears to correspond to the peritectic formation temperature of  $\text{Cs}_4\text{O}$  in Fig. 1. This range is most contradictory between [1973Sim] and [1979Kni], and further clarification is needed.

The  $\beta\text{CsO}_2/\alpha\text{CsO}_2$  transformation line has been added in Fig. 1 to reflect the information given in [Massalski2]. Its validity must be confirmed.

Cs-O crystal structure data given in Table 1 are based on [Pearson3].

The crystal structure of  $\text{Cs}_2\text{O}_3$  was reported but it does not appear in Fig. 1. Because the structure type does not match the stoichiometry, its existence must be reexamined.

## References

- 1973Sim:** A. Simon, Suboxides of Rubidium and Cesium Metals, *Z. Anorg. Allg. Chem.*, 1973, **395**, p 301-319, in German
- 1979Kni:** C.F. Knights and B.A. Phillips, The Cs-O System; Phase Diagram and Oxygen Potentials, *J. Nucl. Mater.*, 1979, **84**, p 196-206