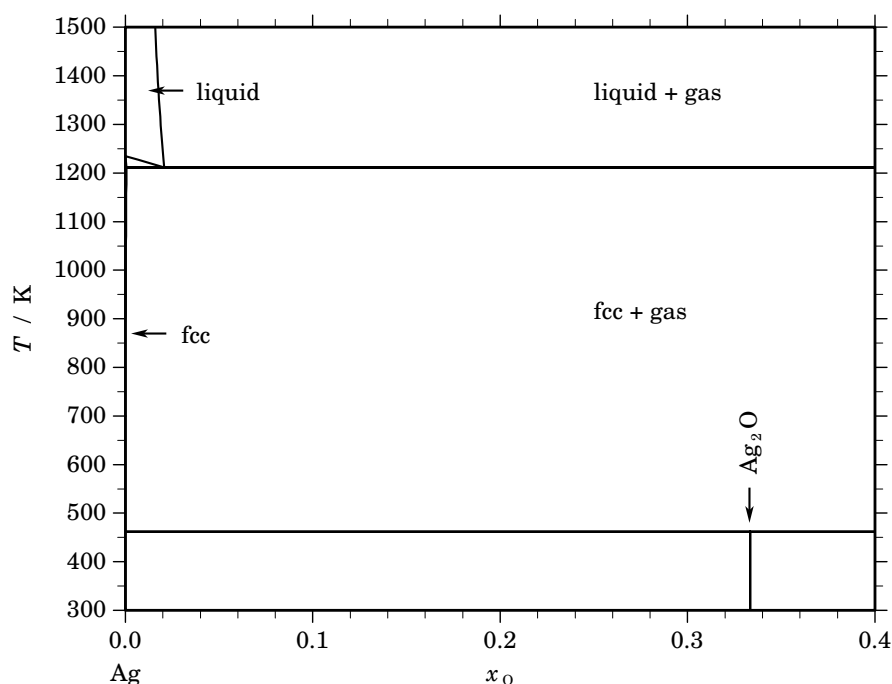


Ag – O (Silver – Oxygen)**Fig. 1.** Calculated phase diagram for the system Ag-O.

The silver-oxygen system has been reviewed and a thermodynamic assessment has been given by [1997Ass]. The stable phases in the system are the liquid, solid silver (fcc) with limited solubility for oxygen and at higher oxygen activities Ag_2O . The optimisation of the dataset is based on the evaluation of a large amount of experimental data from the literature. It includes the solubility and the activities of oxygen in the liquid phase, the solubility of oxygen in solid silver, the oxygen activities in the 2-phase equilibria of the condensed phases, and data for the heat capacity of Ag_2O as well as formation energies for this oxide. In a recent update [2003Hal] the description of the oxygen solubility in solid silver has been switched to an interstitial model.

Table I. Phases, structures and models.

Phase	Strukturbericht	Prototype	Pearson symbol	Space group	SGTE name	Model
liquid					IONIC_LIQUID	$\text{Ag}_p^{1+}(\text{O}^{2-}, \square)_q$
fcc	A1	Cu	<i>cF4</i>	<i>Fm$\bar{3}m$</i>	FCC_A1	$\text{Ag}_1(\text{O}, \square)_1$
Ag_2O	C3	Cu_2O	<i>cP6</i>	<i>Pn$\bar{3}m$</i>	CU2O	Ag_2O_1

Table II. Invariant reactions.

Reaction	Type	T / K	Compositions / x_{O}			$\Delta_r H / (\text{J/mol})$
$\text{liquid} \rightleftharpoons \text{fcc} + \text{gas}$	gas-eutectic	1211.4	0.021	0.001	1.000	−10696
$\text{fcc} + \text{gas} \rightleftharpoons \text{Ag}_2\text{O}$	gas-peritectoid	462.1	0.000	1.000	0.333	−9952

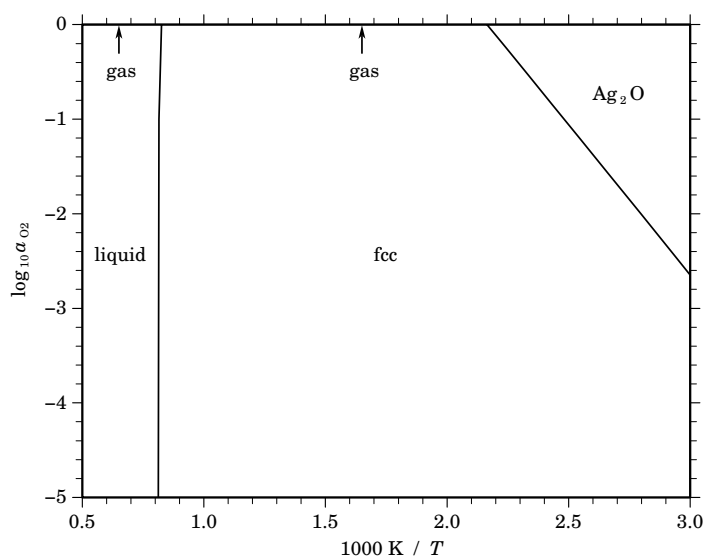


Fig. 2. Calculated temperature-activity phase diagram. Reference state: $\frac{1}{2}\text{O}_2(\text{gas}, 0.1 \text{ MPa})$.

Table III. Standard reaction quantities at 298.15 K for the compounds per mole of atoms.

Compound	x_{O}	$\Delta_{\text{f}}G^{\circ} / (\text{J/mol})$	$\Delta_{\text{f}}H^{\circ} / (\text{J/mol})$	$\Delta_{\text{f}}S^{\circ} / (\text{J/(mol}\cdot\text{K)})$	$\Delta_{\text{f}}C_P^{\circ} / (\text{J/(mol}\cdot\text{K)})$
Ag_2O	0.333	−3599	−10228	−22.233	0.279

References

- [1997Ass] J. Assal, B. Hallstedt, L. Gauckler: J. Am. Ceram. Soc. **80** (1997) 3054–3060; J. Am. Ceram. Soc. **81** (1998) 450–451.
 [2003Hal] B. Hallstedt, L.J. Gauckler: Calphad **27** (2003) 177–191.