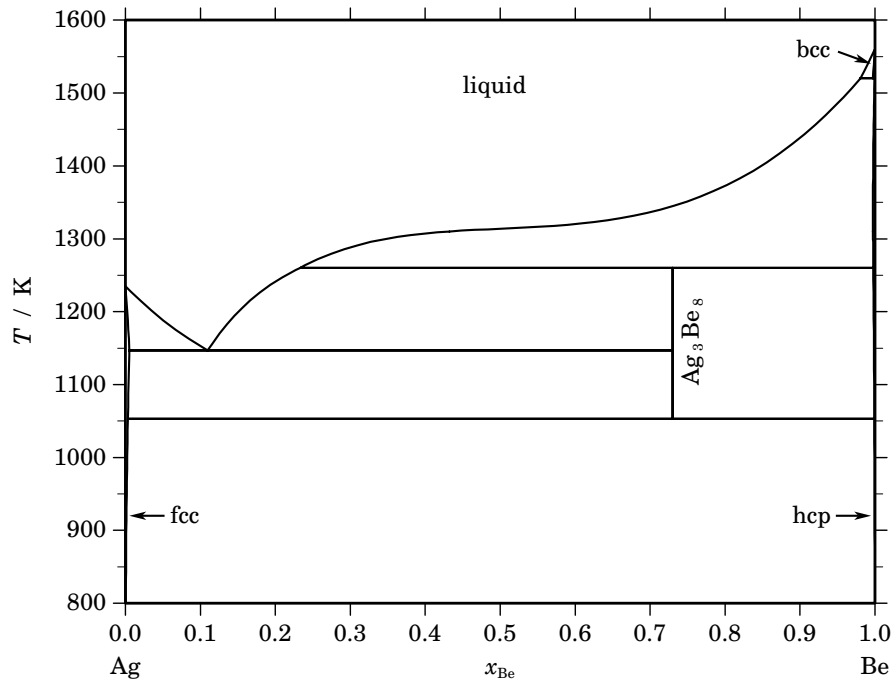


Ag – Be (Silver – Beryllium)**Fig. 1.** Calculated phase diagram for the system Ag-Be.

The equilibrium phases of the Ag-Be system are the liquid, the Ag-based fcc solid solution, the Be-based bcc and the hcp solid solution phases, as well as the high-temperature intermetallic compound Ag_3Be_8 which exists only within a limited temperature range between 1033 K and 1283 K [1973Gol, 1979Ald]. The compound is a Laves phase of the Cu_2Mg type but it has been represented by the formula Ag_3Be_8 since it exists only in a very narrow range at the off-stoichiometric composition of about 73 at.% Be. The Ag-Be system was critically assessed by Korb [2004Kor]. The calculated Ag-Be phase diagram compares well with the data compilation in [1987Oka].

Table I. Phases, structures and models.

Phase	Struktur-bericht	Prototype	Pearson symbol	Space group	SGTE name	Model
liquid					LIQUID	$(\text{Ag},\text{Be})_1$
fcc	A1	Cu	$cF4$	$Fm\bar{3}m$	FCC_A1	$(\text{Ag},\text{Be})_1$
Ag_3Be_8	C15	Cu_2Mg	$cF24$	$Fd\bar{3}m$	AG3BE8	Ag_3Be_8
bcc	A2	W	$cI2$	$Im\bar{3}m$	BCC_A2	$(\text{Ag},\text{Be})_1$
hcp	A3	Mg	$hP2$	$P6_3/mmc$	HCP_A3	$(\text{Ag},\text{Be})_1$

Table II. Invariant reactions.

Reaction	Type	T / K	Compositions / x_{Be}			$\Delta_r H / (\text{J/mol})$
$\text{bcc} \rightleftharpoons \text{liquid} + \text{hcp}$	metatectic	1520.5	0.997	0.981	0.999	–5040
$\text{liquid} + \text{hcp} \rightleftharpoons \text{Ag}_3\text{Be}_8$	peritectic	1260.1	0.233	0.998	0.730	–3200
$\text{liquid} \rightleftharpoons \text{fcc} + \text{Ag}_3\text{Be}_8$	eutectic	1146.7	0.110	0.005	0.730	–13223
$\text{Ag}_3\text{Be}_8 \rightleftharpoons \text{fcc} + \text{hcp}$	eutectoid	1053.2	0.730	0.003	0.999	–2484

Table IIIa. Integral quantities for the liquid phase at 1600 K.

x_{Be}	ΔG_{m} [J/mol]	ΔH_{m} [J/mol]	ΔS_{m} [J/(mol·K)]	G_{m}^{E} [J/mol]	S_{m}^{E} [J/(mol·K)]	ΔC_P [J/(mol·K)]
0.000	0	0	0.000	0	0.000	0.000
0.100	−2444	1988	2.770	1880	0.067	0.000
0.200	−3311	3522	4.270	3346	0.110	0.000
0.300	−3729	4608	5.211	4397	0.132	0.000
0.400	−3922	5249	5.732	5031	0.136	0.000
0.500	−3974	5450	5.890	5247	0.127	0.000
0.600	−3910	5215	5.703	5043	0.107	0.000
0.700	−3709	4548	5.161	4418	0.082	0.000
0.800	−3287	3454	4.213	3370	0.053	0.000
0.900	−2427	1936	2.727	1898	0.024	0.000
1.000	0	0	0.000	0	0.000	0.000

Reference states: Ag(liquid), Be(liquid)

Table IIIb. Partial quantities for Ag in the liquid phase at 1600 K.

x_{Ag}	ΔG_{Ag} [J/mol]	ΔH_{Ag} [J/mol]	ΔS_{Ag} [J/(mol·K)]	G_{Ag}^{E} [J/mol]	S_{Ag}^{E} [J/(mol·K)]	a_{Ag}	γ_{Ag}
1.000	0	0	0.000	0	0.000	1.000	1.000
0.900	−1195	227	0.889	207	0.013	0.914	1.016
0.800	−2140	903	1.902	829	0.046	0.851	1.064
0.700	−2876	2019	3.059	1869	0.094	0.806	1.151
0.600	−3465	3568	4.395	3331	0.148	0.771	1.285
0.500	−4004	5539	5.964	5217	0.201	0.740	1.480
0.400	−4660	7925	7.865	7529	0.247	0.704	1.761
0.300	−5744	10717	10.288	10272	0.278	0.649	2.164
0.200	−7963	13907	13.668	13448	0.287	0.550	2.748
0.100	−13572	17486	19.411	17059	0.266	0.361	3.605
0.000	−∞	21445	∞	21110	0.210	0.000	4.888

Reference state: Ag(liquid)

Table IIIc. Partial quantities for Be in the liquid phase at 1600 K.

x_{Be}	ΔG_{Be} [J/mol]	ΔH_{Be} [J/mol]	ΔS_{Be} [J/(mol·K)]	G_{Be}^{E} [J/mol]	S_{Be}^{E} [J/(mol·K)]	a_{Be}	γ_{Be}
0.000	−∞	22155	∞	20867	0.805	0.000	4.800
0.100	−13690	17831	19.701	16941	0.556	0.357	3.573
0.200	−7994	13997	13.745	13417	0.363	0.548	2.742
0.300	−5721	10647	10.230	10296	0.219	0.650	2.168
0.400	−4608	7771	7.737	7582	0.118	0.707	1.768
0.500	−3944	5361	5.816	5277	0.052	0.743	1.487
0.600	−3410	3409	4.262	3385	0.015	0.774	1.290
0.700	−2836	1905	2.963	1909	−0.003	0.808	1.154
0.800	−2118	841	1.849	850	−0.006	0.853	1.066
0.900	−1189	209	0.873	213	−0.003	0.915	1.016
1.000	0	0	0.000	0	0.000	1.000	1.000

Reference state: Be(liquid)

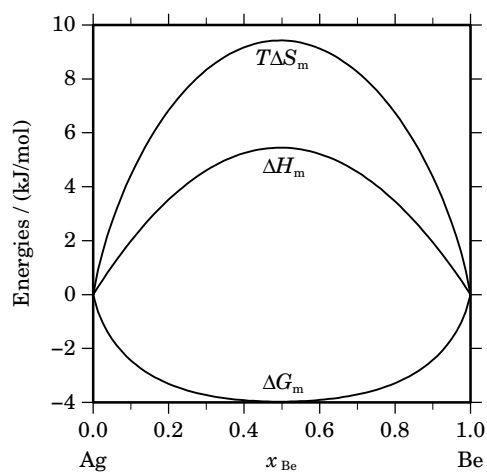


Fig. 2. Integral quantities of the liquid phase at $T=1600$ K.

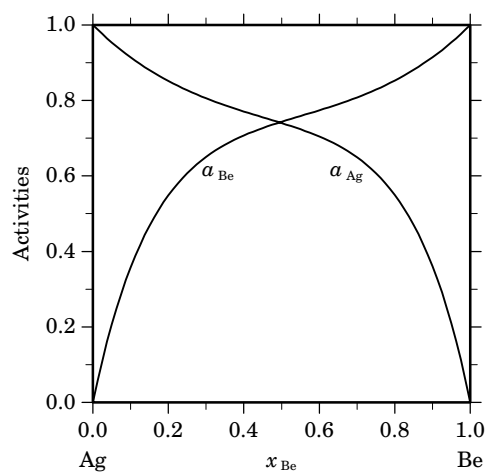


Fig. 3. Activities in the liquid phase at $T=1600$ K.

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

Compound	x_{Be}	$\Delta_f G^\circ$ / (J/mol)	$\Delta_f H^\circ$ / (J/mol)	$\Delta_f S^\circ$ / (J/(mol·K))	$\Delta_f C_P^\circ$ / (J/(mol·K))
Ag_3Be_8	0.730	1838	2569	2.452	0.000

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