

Zn-O-S Predominance Diagram at 900K

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Zinc-oxygen-sulfur predominance diagram
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**See
Multiple
Charts**

Multiple Charts
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T	900 K	800 to 1200	A	B	C	Rxn	ΔG° (cal/gmol)	Log Keq
$T_{m,Zn}$	3 K							
R	1.987 cal/gmol/K							
1	$3ZnSO_4(\alpha,\beta) = ZnO \cdot 2ZnSO_4(s) + SO_3$		53730	-45.21		R_1	1.30E+04	-3.166479
2	$0.5ZnO \cdot 2ZnSO_4(s) = 1.5ZnO(s) + SO_3$		57190	-65.63	7.6	R_2	1.83E+04	-4.450703
3	$SO_3 = SO_2 + 0.5O_2$		25010	-40.52	5.56	R_3	3.33E+03	-0.807349
4	$Zn(s,l) + 0.5O_2 = ZnO(s)$		-84480	25.55		R_4	-6.15E+04	14.929142
5	$2Zn(s,l) + S_2 = 2ZnS(s)$		-123480	48.54		R_5	-7.98E+04	19.374742
6	$0.5S_2 + O_2 = SO_2$		-86520	17.48		R_6	-7.08E+04	17.187999

Location of triple points

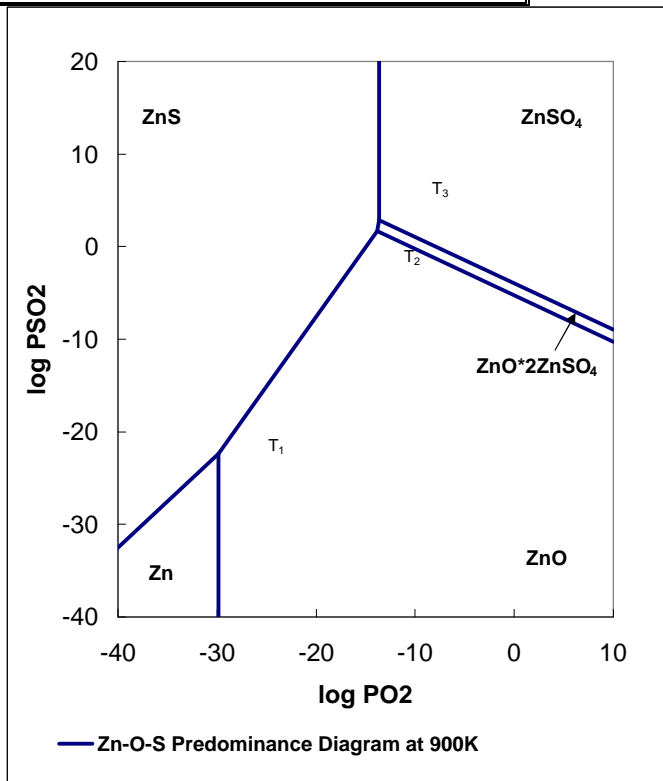
Zn/ZnS	ZnS/ZnO	ZnS/BS	ZnS/ZnSO ₄
$Zn + SO_2 = ZnS + O_2$	$ZnO + SO_2 = ZnS + 1.5O_2$	$ZnO \cdot 2ZnSO_4 + SO_2 = 3ZnS + 5.5O_2$	$ZnS + 2O_2 = ZnSO_4$
$\Delta G^\circ 1$ 30891	$\Delta G^\circ 2$ 92376	$\Delta G^\circ 3$ 320438.1	$\Delta G^\circ 4$ -112268
m1 1	m2 1.5	m3 5.5	m4 vert. line
$\log K_1$ -7.50	$\log K_2$ -22.43	$\log K_3$ -77.81	$\log K_4$ 27.26
$\log P_{SO_2} = \log P_{O_2} + 7.50$	$\log P_{SO_2} = 1.5 \cdot \log P_{O_2} + 22.43$	$\log P_{SO_2} = 5.5 \cdot \log P_{O_2} + 77.81$	$\log P_{O_2} = -0.5 \cdot 27.26$

	Zn/ZnO/ZnS	ZnS/ZnO/BS	ZnS/ZnSO ₄ /BS
Triple	T1_logP _{O2} -29.86	T2_logP _{O2} -13.84	T3_logP _{O2} -13.63
Points	T1_logP _{SO2} -22.36	T2_logP _{SO2} 1.66	T3_logP _{SO2} 2.84

Auxiliary equations of equilibrium

ZnO/BS	$3ZnO + 2SO_2 + O_2 = ZnO \cdot 2ZnSO_4$	mBS1 -0.5
ZnSO ₄ /BS	$3ZnSO_4 = ZnO \cdot 2ZnSO_4 + 0.5O_2 + SO_2$	mBS2 -0.5

Lines	P _{SO2}	P _{O2}
ZnS/ZnO	-22.36 1.66	-29.86 -13.84
ZnS/BS	1.66 2.84	-13.84 -13.63
Zn/ZnO	-22.36 -80.00	-29.86 -29.86
ZnS/ZnSO ₄	2.84 40.00	-13.63 -13.63
Zn/ZnS	-22.36 -92.50	-29.86 -100.00
ZnO/BS	1.66 -10.26	-13.84 10.00
ZnSO ₄ /BS	2.84 -8.97	-13.63 10.00



Run Summary
Macro

800 Low_Temp
1000 High_Temp