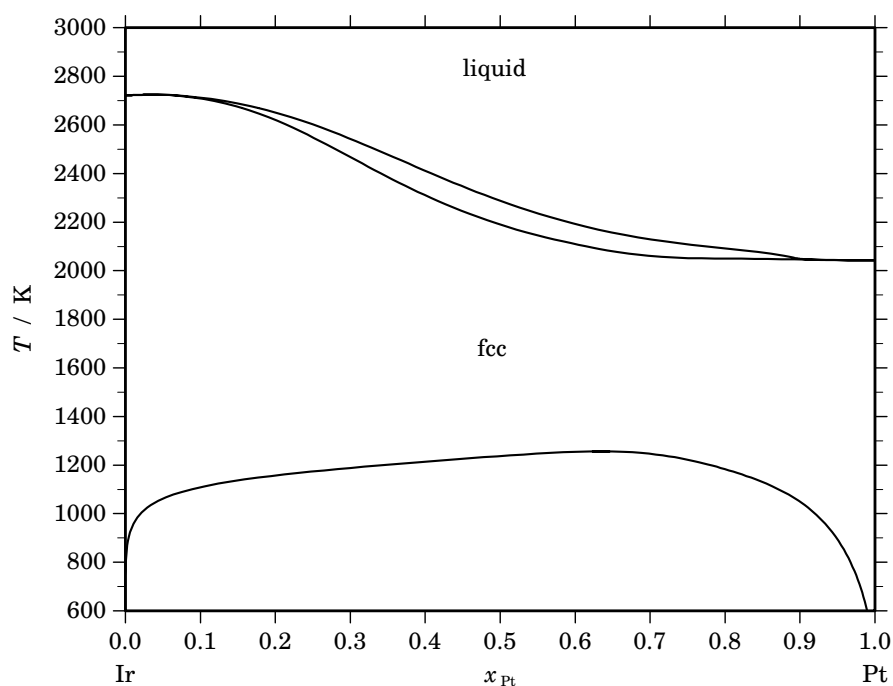


Ir – Pt (Iridium – Platinum)**Fig. 1.** Calculated phase diagram for the system Ir-Pt.

The equilibrium phases in the Ir-Pt system are the liquid phase and the fcc phase, exhibiting a miscibility gap. Experimental data on the Ir-Pt system are limited, the liquid and fcc phase boundaries were studied by [1930Mül], the miscibility gap in the fcc phase was investigated by [1956Rau]. The thermodynamic descriptions for all the stable phases in the Ir-Pt system were obtained by Korb and Jantzen [2004Kor] using available experimental data [1930Mül, 1956Rau]. The calculated phase diagram compares well with experimental data from the literature as collected in [1990Mas].

Table I. Phases, structures and models.

Phase	Struktur- bericht	Prototype	Pearson symbol	Space group	SGTE name	Model
liquid					LIQUID	(Ir,Pt) ₁
fcc	A1	Cu	cF4	$Fm\bar{3}m$	FCC_A1	(Ir,Pt) ₁

Table II. Invariant reactions.

Reaction	Type	T / K	Compositions / x_{Pt}			$\Delta_r H / (J/mol)$
liquid \rightleftharpoons fcc	congruent	2724.0	0.037	0.037		-37912
fcc \rightleftharpoons fcc' + fcc''	critical	1255.6	0.634	0.634	0.634	0

Table IIIa. Integral quantities for the liquid phase at 2800 K.

x_{Pt}	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	−14600	3112	6.326	−7032	3.623	0.000
0.200	−22737	5870	10.217	−11088	6.056	0.000
0.300	−26919	8149	12.524	−12697	7.445	0.000
0.400	−28059	9821	13.528	−12391	7.933	0.000
0.500	−26835	10759	13.426	−10698	7.663	0.000
0.600	−23818	10836	12.377	−8150	6.781	0.000
0.700	−19497	9926	10.508	−5276	5.429	0.000
0.800	−14256	7901	7.913	−2606	3.752	0.000
0.900	−8239	4634	4.598	−671	1.895	0.000
1.000	0	0	0.000	0	0.000	0.000

Reference states: Ir(liquid), Pt(liquid)

Table IIIb. Partial quantities for Ir in the liquid phase at 2800 K.

x_{Ir}	ΔG_{Ir} [J/mol]	ΔH_{Ir} [J/mol]	ΔS_{Ir} [J/(mol·K)]	G_{Ir}^{E} [J/mol]	S_{Ir}^{E} [J/(mol·K)]	a_{Ir}	γ_{Ir}
1.000	0	0	0.000	0	0.000	1.000	1.000
0.900	−4029	155	1.495	−1576	0.619	0.841	0.935
0.800	−10794	791	4.137	−5599	2.282	0.629	0.786
0.700	−19311	2160	7.668	−11008	4.703	0.436	0.623
0.600	−28634	4517	11.840	−16742	7.592	0.292	0.487
0.500	−37879	8115	16.426	−21742	10.663	0.197	0.393
0.400	−46279	13208	21.246	−24947	13.627	0.137	0.342
0.300	−53327	20051	26.206	−25298	16.196	0.101	0.337
0.200	−59202	28896	31.464	−21734	18.082	0.079	0.393
0.100	−66800	39997	38.142	−13194	18.997	0.057	0.567
0.000	−∞	53609	∞	1380	18.653	0.000	1.061

Reference state: Ir(liquid)

Table IIIc. Partial quantities for Pt in the liquid phase at 2800 K.

x_{Pt}	ΔG_{Pt} [J/mol]	ΔH_{Pt} [J/mol]	ΔS_{Pt} [J/(mol·K)]	G_{Pt}^{E} [J/mol]	S_{Pt}^{E} [J/(mol·K)]	a_{Pt}	γ_{Pt}
0.000	−∞	32460	∞	−86968	42.653	0.000	0.024
0.100	−109737	29719	49.806	−56132	30.661	0.009	0.090
0.200	−70511	26189	34.536	−33042	21.154	0.048	0.242
0.300	−44669	22123	23.854	−16640	13.844	0.147	0.489
0.400	−27196	17777	16.062	−5864	8.443	0.311	0.777
0.500	−15792	13402	10.426	345	4.663	0.507	1.015
0.600	−8844	9254	6.464	3048	2.216	0.684	1.140
0.700	−4999	5586	3.780	3305	0.815	0.807	1.153
0.800	−3019	2652	2.025	2176	0.170	0.878	1.098
0.900	−1732	705	0.871	721	−0.005	0.928	1.031
1.000	0	0	0.000	0	0.000	1.000	1.000

Reference state: Pt(liquid)

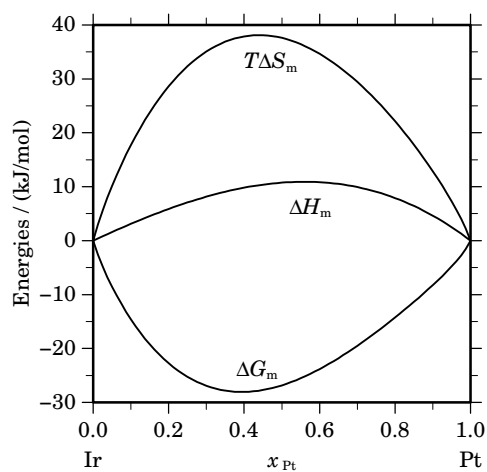


Fig. 2. Integral quantities of the liquid phase at $T=2800$ K.

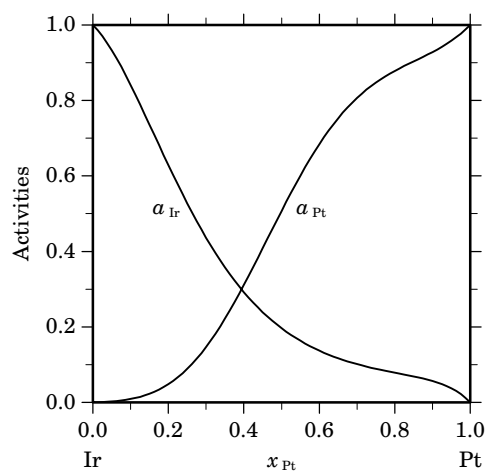


Fig. 3. Activities in the liquid phase at $T=2800$ K.

Table IVa. Integral quantities for the stable phases at 1400 K.

Phase	x_{Pt}	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)]
fcc	0.000	0	0	0.000	0	0.000	0.000
	0.100	-3247	8899	8.676	537	5.973	0.000
	0.200	-4557	14443	13.571	1268	9.410	0.000
	0.300	-5035	17147	15.844	2076	10.765	0.000
	0.400	-4992	17529	16.086	2842	10.491	0.000
	0.500	-4618	16106	14.803	3450	9.040	0.000
	0.600	-4052	13394	12.461	3782	6.866	0.000
	0.700	-3390	9911	9.501	3720	4.422	0.000
	0.800	-2677	6173	6.321	3148	2.160	0.000
	0.900	-1837	2697	3.239	1947	0.536	0.000
	1.000	0	0	0.000	0	0.000	0.000

Reference states: Ir(fcc), Pt(fcc)

Table IVb. Partial quantities for Ir in the stable phases at 1400 K.

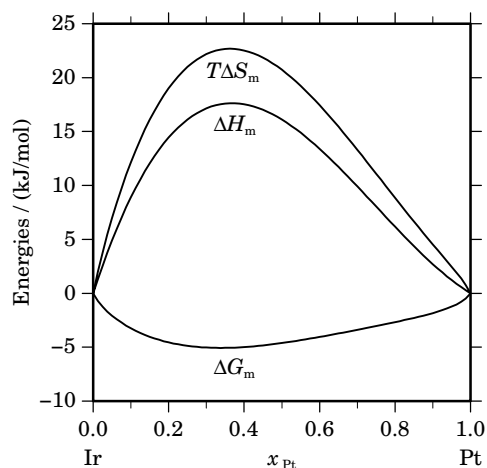
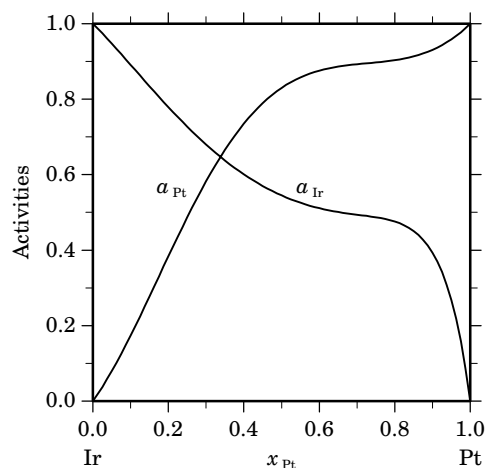
Phase	x_{Ir}	ΔG_{Ir} [J/mol]	ΔH_{Ir} [J/mol]	ΔS_{Ir} [J/(mol·K)]	G_{Ir}^E [J/mol]	S_{Ir}^E [J/(mol·K)]	a_{Ir}	γ_{Ir}
fcc	1.000	0	0	0.000	0	0.000	1.000	1.000
	0.900	-1343	1764	2.219	-117	1.343	0.891	0.990
	0.800	-2907	6367	6.625	-309	4.769	0.779	0.974
	0.700	-4496	12776	12.337	-344	9.371	0.680	0.971
	0.600	-5931	19956	18.491	15	14.244	0.601	1.001
	0.500	-7066	26874	24.243	1003	18.480	0.545	1.090
	0.400	-7812	32496	28.792	2854	21.173	0.511	1.278
	0.300	-8212	35789	31.429	5803	21.418	0.494	1.646
	0.200	-8649	35717	31.690	10086	18.308	0.476	2.378
	0.100	-10867	31249	30.082	15936	10.938	0.393	3.932
	0.000	$-\infty$	21349	∞	23590	-1.601	0.000	7.588

Reference state: Ir(fcc)

Table IVc. Partial quantities for Pt in the stable phases at 1400 K.

Phase	x_{Pt}	ΔG_{Pt} [J/mol]	ΔH_{Pt} [J/mol]	ΔS_{Pt} [J/(mol·K)]	G_{Pt}^{E} [J/mol]	S_{Pt}^{E} [J/(mol·K)]	a_{Pt}	γ_{Pt}
fcc	0.000	$-\infty$	107497	∞	4011	73.919	0.000	1.411
	0.100	−20382	73117	66.785	6421	47.640	0.174	1.736
	0.200	−11155	46744	41.357	7579	27.975	0.384	1.918
	0.300	−6293	27346	24.028	7722	14.017	0.582	1.941
	0.400	−3583	13888	12.480	7083	4.861	0.735	1.838
	0.500	−2171	5337	5.363	5898	−0.400	0.830	1.660
	0.600	−1545	659	1.575	4401	−2.673	0.876	1.459
	0.700	−1324	−1180	0.103	2828	−2.863	0.893	1.275
	0.800	−1184	−1214	−0.021	1414	−1.877	0.903	1.129
	0.900	−834	−476	0.256	393	−0.620	0.931	1.034
	1.000	0	0	0.000	0	0.000	1.000	1.000

Reference state: Pt(fcc)

**Fig. 4.** Integral quantities of the stable phases at $T=1400$ K.**Fig. 5.** Activities in the stable phases at $T=1400$ K.

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