

Physical and Chemical Properties

Melting temperatures [° C] of low melting precious metal alloys

Alloy	Pt	Pd	Au	Ag	Rh	Ir
B	825	743	1050	961	1131	1046
Si	830	798	370	835	1389	1470
P	588	788	935	878	1245	1262
As	597	–	665	540	–	–
Sn	1070	–	278	221	–	–
Sb	633	590	360	485	610	–
Pb	290	265	213	304	–	–
Bi	730	–	241	262	–	–
S	1240	623	–	742	925	–



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Resistance of the Platinum Group Metals to Corrosive Media

Corrosive medium	Chemical formula	Temperature [° C]	Pt	Pd	Au	Ag	Rh	Ir
Aluminum sulphate	Al ₂ (SO ₄) ₃	100	1	1	1	1	1	–
Bromine, dry	Br ₂	20	3	4	1	1	1	4
Bromine, moist	Br ₂	20	3	4	1	1	1	2
Bromine water		20	1	2	1	1	1	–
Hydrobromic acid	HBr	20	2	4	2	1	1	1
Hydrobromic acid	HBr	100	4	4	3	1	1	3
Chloride, dry	Cl ₂	20	2	3	1	1	1	1
Chlorode, moist	Cl ₂	20	2	4	1	1	1	3
Acetic acid, glacial	CH ₃ COOH	100	1	1	1	1	1	–
Fluorine	F ₂	20	2	–	–	–	–	–
Hydrofluoric acid 40 %	HF	20	1	1	1	1	1	1
Iodine, dry	I ₂	20	1	4	1	1	1	2
Iodine, moist	I ₂	20	1	2	2	1	1	1
Hydroiodic acid	HI	20	1	4	1	1	1	2
Potassium hydroxide	KOH	400	3	2	2	–	4	4
Potassium cyanide	KCN	20	1	3	–	–	–	–
Potassium cyanide	KCN	100	3	4	–	–	–	–
Potassium bisulphate	KHSO ₄	500	1	2	3	1	–	–
Aqua regia	HNO ₃ + 3 HCl	20	4	4	1	1	1	4
Aqua regia	HNO ₃ + 3 HCl	100	4	4	1	2	1	4
Copper chloride	CuCl ₂	100	1	2	–	–	–	–
Copper sulphate	CuSO ₄	100	1	1	1	1	1	–
Sodium hypochlorite	NaClO	20	1	3	2	2	4	4
Sodium hydroxide	NaOH	500	2	2	2	–	4	4
Ortho-phosphoric acid	H ₃ PO ₄	100	1	2	1	1	1	4
Mercuric chloride	HgCl ₂	100	1	1	1	1	3	–
Nitrit acid 95 %	HNO ₃	100	1	4	1	1	1	4
Sulphurite acid 36 %	HCl	20	1	1	1	1	1	1
Sulphurite acid 65 %	HCl	20	1	4	1	1	1	3
Sulphurite acid 65 %	HCl	100	2	4	1	1	1	4
Hydrochloric Acid 96 %	H ₂ SO ₄	20	1	1	1	1	1	1
Hydrochloric Acid 96 %	H ₂ SO ₄	100	1	3	2	1	1	1
Hydrochloric Acid 96 %	H ₂ SO ₄	300	2	4	3	–	–	–
Hydrogen sulphide	H ₂ S	20	1	1	1	1	1	1
Selenic acid	H ₂ SeO ₄	20	1	3	–	–	–	–
Selenic acid	H ₂ SeO ₄	100	3	4	–	–	–	–
Hydrogen peroxide	H ₂ O ₂	100	4	–	–	–	–	–

1 = no corrosion 2 = slight corrosion 3 = noticable corrosion 4 = destructive corrosion

The values given in the table are guidelines and cannot be guaranteed for specific applications.

Material	Melting Point Melting Range [° C]	Density [g/cm³]	Linear expansion coefficient (20 – 100°C) 10-6 [K-1]	Electrical resistivity (annealed) bei 20°C [V • mm² • m-1]	Temperature coefficient of electrical resistivity (0 – 100°C) 10-4 [K-1]	Thermal conductivity at 20°C [Wm-1K-1]	Yield point		Tensile strength		Tensile elongation [%]		Vickers hardness		Young's modulus [GPa]
							annealed	hard	annealed	hard	annealed	hard	annealed	hard	
Pt	1769	21.45	9.1	0.107	39.0	74	70	290	150	330	40	3.0	42	98	170
Ir	2447	22.65	6.8	0.049	43.0	59	93	–	450	–	7	–	210	453	528
Pd	1554	12.02	11.1	0.099	38.0	75	65	400	180	480	35	3.0	40	210	121
Rh	1963	12.41	8.3	0.043	46.0	88	68	–	800	1925	9	–	410	410	380
Os	3050	22.61	6.1	0.096	42.0	87	–	–	–	–	–	–	350	1000	570
Ru	2315	12.20	9.1	0.073	46.0	105	38	–	500	–	3	–	240	750	430
Au	1063	19.32	14.1	0.027	40.0	312	50	260	180	300	40	3.0	40	90	78
Ag	961	10.49	18.7	0.016	41.0	419	120	320	140	380	37	3.0	35	110	80
PtRh 10	1840 – 1870	20.00	10.0	0.200	16.3	30	180	670	300	680	32	1.5	102	204	255
PtRh 20	1870 – 1910	18.10	9.3	0.208	13.4	–	110	920	380	940	32	2.0	113	273	268
PtIr 10	1780 – 1800	21.60	8.6	0.250	12.0	31	220	630	340	650	32	2.0	105	215	220
PtIr 20	1830 – 1855	21.70	7.7	0.310	7.5	–	380	920	570	940	21	2.0	190	300	230
PtAu 5	1675 – 1745	21.32	–	0.180	21.0	–	370	610	460	635	7	1.0	139	194	180