

Technical Information: Properties of Refractory and Ceramic Materials

Material	Melting Point	Limit of Application	Hardness Moh's Scale	Density	Specific Heat (mean) 25-1000°C	Linear Coefficient of expansion	Thermal Conductivity	Electrical Resistivity
UNITS	°C	°C		g/cm ³	J/kg °C	25-800 °C x 10 ⁶ /°C	@°C W/m °C	@°C ohm/cm
Alumina (Al ₂ O ₃)	2050	1950	9	3.96	1050	8.0	4@1315	10 ⁶ @1100
Beryllia (BeO)	2550	2400	9	3.0	2180	7.5	29@1000	4 x 10 ⁸ @600 8 x 10 ¹² @2100
Magnesia (MgO)	2850	2400	6	3.60	1170	13.5	59@1100	2 x 10 ⁸ @850
Thoria (ThO ₂)	3220 approx	2700	7	9.5-9.9	290	9.5	3@1000	2.6 x 10 ⁷ @550 1.5 x 10 ⁴ @1200
Zirconia (ZrO ₂)	2700	2400	6.5	5.5-5.8	590	7.5	3@1315	10 ⁶ @385 3.6 x 10 ⁴ @1200
Zircon (ZrO ₂ SiO ₂)	2500 approx	1870	7.5	4.5-4.7	630	4.5	4@1200	High
Spinel (MgO Al ₂ O ₃)	2130	1900	8	3.60	1050	8.5	2@1315	2.8 x 10 ⁷ @500 2.0 x 10 ⁵ @110
Mullite (3Al ₂ O ₃ 2SiO ₂)	1850	1800	---	2.8	840	5.0	4@1200	10 ⁵ - 10 ⁹ @815 - 1370
Sillimanite (Al ₂ O ₃ SiO ₂)	1800 approx	1800	6.5	3.2	840	5.0	2@1300	10 ⁴ - 10 ⁵ @815 - 1370
Silicon Carbide (SiC)	2200-2700 Decomposes	1400-1700 Oxidizes	9	3.2	840	4.5	13@1100	7420 -745 @1000 - 1500
Silicon Nitride (Si ₃ N ₄)	1900 Sublimes	1400 in air 1850 in inert	9	3.18	1050	α=2.9 β=2.3	9.5@1200	10 ¹³ @25 10 ¹⁰ @480
Carbon Graphite (C) varies	3600 Sublimes	---	0.5-1.0	2.2	1600	2.2	147@50 63@900	10 ³
Quartzite (SiO ₂)	1400	1090	7	2.65	1170	8.6	2.60@1200	10 ¹⁴ @20 5 x 10 ³ @1300
Boron Carbide (B ₄ C)	2350	540 in air 2260 in inert	9.3	2.5	2090	5.7	17.3@800	---
Baron Nitride (BN)	2721	650 Oxidizes	2	2.1	1570	7.5 // 0.77⊥	26@900	1.7 x 10 ¹³ @25// 2.3 x 10 ¹⁰ @480//
Titanium Carbide (TiC)	3140	1500 Oxidizes	9 - 10	6.5	1050	6.9	40@1100	---
Tungsten Carbide	2780	---	9 - 10	14.3	300	6.3	43.3@1100	---