

Al₂O₃; Sapphire Properties

	A-pl	C-pl
CHEMICAL COMPOSITION:	Al ₂ O ₃	
PHYSICAL/ MECHANICAL		
Density	3,98 g/cm ³	
Hardness- Mohs	9	
Hardness-Knoop	1900	2200
Young's modulus	345 GPa	
Tensile strength	400 MPa (25°C) 275 MPa (500°C) 345 MPa (1000°C)	
Compressive strength	2,0 GPa	
Flexural strength	450-895 MPa	
Rigidity modulus	175 Gpa at room temp	
Poisson's ratio	0.27-0.30	
ELECTRICAL		
Resistivity	1016 Ohm·cm (25°C), 1011 Ohm·cm (500°C), 106 Ohm·cm (1000°C)	
Dielectric constant	11,5 (103 - 109 Hz, 25°C)	9,3 (103 - 109 Hz, 25°C)
Dielectric strength	480,000 v/cm	
Magnetic Susceptibility	-0.21×10 ⁻⁶ to -0.25×10 ⁻⁶	
THERMAL		
Melting point	2323K (2050°C)	
Maximum usable temperature	~1800°C (3272°F)	
Thermal expansion coefficient	6,7 x 10 ⁻⁶ / °C	5.0 x 10 ⁻⁶ / °C
Thermal conductivity	46,06W/(mK) (0°C)	
Specific heat	0.75 (J/g*K)	
OPTICAL		
Refractive index	1.768 @0.589.3µm	1.76 @0.589.3µm
Transmission range	80~90% at 0,25 - 4,50 um (@ 0.1 mm thick)	
Birefringence	0.0087	
Absorption	<0.01@2-3µm	

Note: The above properties may depend on the relative crystal orientation/ form/ surface quality /material source.