Sapphire Data Table

	Properties	Units	Sapphire (parallel to C axis)	Sapphire (perpendicular to C axis)	Alumina 99.9 %	Alumina 99.5 %	Quartz	Silicon Carbide	Silicon Nitride	Aluminum Nitride
PHYSICAL	Density	g/cm^3	3.97	3.97	3.96	3.98	2.2	3.1	3.18-3.30	3.25
	Young's Modulus	Gpa at R.T	435		386	372	70	393	311	300
	Modulus of rigidity (shear)	Gpa at R.T	175		158	152	31	166		
	Poisson's Ratio		0.27-0.30	0.27-0.30	0.22	0.22	0.17	1.19		
	Flexural Strength	MPa	1035	760	550	350	80	462	338-900	300
	Compressive Strength	MPa at R.T	2000		3700	2600	550-1100	2500		
	Hardness	Knoop	1900	2200	1440	1551	1250	2500		1050
ELECTRICAL	Volume Resistivity	ohm-cm at R.T	1×10^{16}	1×10^{16}	1×10^{14}	1×10^{14}	7×10^{7}	1×10^{8}	1×10^{12}	1×10^{14}
	Dielectric Strength	volts/cm	480000	480000	315000	331000	500000			
	Dielectric Constant	10^3-10^9 Hz	11.5	9.3	9.8	9.7	3.75			8.5
	Loss Tangent	$*10^5$ @ 10^{10} Hz	8.6	3.0	2.0	2.0	0.4			
	Magnetic Susceptability	$*10^6$	-0.21	-0.25						
THERMAL	Melting Point	0^C	2053	2053			1683			
	Maximum usable temperature	0^C	2000	2000	1900	1750	1200	1400	1200-1400	1600
	Specific Heat	cal/g0 K at R.T	0.181	0.181	0.21	0.20	0.16	0.15	0.17	
	Thermal Conductivity	watts/m0 K at R.T	40	40	39	36	1.4	125	12--15	115
	Coefficient of Thermal Expansion	$*10^{-6}$ at 25-10000^C	8.8	7.9	8.4	8.2	0.55	4.3	3.0	5.7
OPTICAL	Refractive index		1.768	1.76	opaque	opaque	1.46	opaque	opaque	opaque
	Optical Transmission Range(80%)	nm (1 cm thick)	200-3500	200-3500	opaque	opaque	270-2400	opaque	opaque	opaque