

Properties	Units	Test	99.5% Alumina	Zirconia	Silicon Carbide	Quartz	Aluminum Nitride	Boron Nitride	Silicon	Sapphire	Silicon Nitride	Corning Macor*	Boron Carbide	BK7	Zerod ur
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Mechanical

Tensile Strength	Mpa @ R.T.	ACMA Test #4	260-300	248	310	48	-	2.41 (1000°C)	113	250-400	360-434	90	350		57
Compressive Strength	Mpa @ R.T.	ASTM C773	2070-2620	2500	1725-2500	650-1100	2068	23.5	120	2000	689-2760	345	1380-2855		
Poisson's Ratio		ASTM C818	0.22	0.32	0.19	0.17	0.25	0.05	0.28	0.29	0.23	0.29	0.204	0.21	0.24
Flexural Strength (MOR)	Mpa @ R.T.	ASTM F417	310-379	900	324	80	428	51.8	-300	760-1035	679-896	94	303-480		
Modulus of Elasticity (Young's Mod)	GPa	ASTM C848	380	207	476	70	308	675	112	250-400	317	66.9	289-450	85	83-90
Fracture Toughness	Mpa x m ^{1/2}	Notched Beam Test	4.0	13.0	4.0	-	3.5	2.6	3.0-6.0	1.89	5.0-8.0	1.53	2.9-3.7		

Physical

Chemical Formula			Al ₂ O ₃	ZrO ₂	α-SiC	SiO ₂	AlN	BN	Si	α-Al ₂ O ₃	Si ₃ N ₄	Glass ceramic	B ₄ C		
Density	g/cm ³	ASTM C20	3.70-3.97	6.04	3.21	2.21	3.25	2.6	2.33	3.97	3.31	2.52	2.52	2.51	
Crystal Structure			hexagonal	tetragonal	hexagonal	hexagonal	hexagonal	hexagonal	Cubic	Trigonal	Hexagonal (α& β)	Random	Rhomboh edra		
Color			Ivory/white	white	Dark gray	White/transpare nt	White/tan /gray	White	Gray	White/transparent	Dark gray	White	Dark Grey		Transp arent
Hardness	Moh's		8.3	8.5	9-10	7	5	2	7	9	9	4.5	9.3	5	
Hardness	Kg/mm ²	KNOOP	1450	1600	2800	>600	1170	25-205	1150	2200	2200	250	2400	520-610	620
Water Absorption			0.0	0.0	0.0	0.0	0.0	0.0-1.0	0.0	0.0	0.0	0.0	0		

Electrical

Dielectric Strength	KV/mm	ASTM D116	8.7	9.0	-	25-40	15	374	-	15-50	17.7	40			
Dielectric Constant	1MHz @ R.T.	ASTM D150	9.7	26 @100kHz	10.2	3.8	8.0-9.1	4.08	11.8	9.3-11.4	7.0	6.03	4.8-8		7.4
Electrical Resistivity	Wcm @ R.T.	ASTM D1829	>10 ¹⁴	>10 ¹³	10 ⁸	6x10 ¹⁰	>10 ¹⁴	10 ¹³	10 ³	10 ¹⁷	10 ¹³	>10 ¹⁷	0.1-10		

Thermal

Thermal Shock Resistance	AT (°C)	Quenchin g	200	280-360	350-500	>1400	400	>1500	-	200	750	25-100	130-180		
Max. Use Temperature (*denotes inert atm).	°C	No load cond.	1750	500	1400	1200	1600	985	1350	2000	1500	1000	600-1000	350	600-850
Specific Heat	Cal/g-°C @ R.T.	ASTM C351	0.21	.10	0.15	0.16	0.25	0.19	0.18	0.18	0.17	0.19			
Thermal Conductivity	W/m-K @ R.T.	ASTM C408	30	2.7	41	1.4	82.3	20	125	40	27	1.46	28-92	1.1	1.46-1.6
Coefficient of Linear Thermal Expansion	µm/m-°C (~25°C through ±1000°C)	ASTM C372	8.2	11.0	5.12	0.45	4.6-5.7	1.0-2.0	2.19-4.44	7.9-8.8	3.4	6.3-9.7	5.6	7.1	-0.1-0.1

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