

## Properties of sapphire crystal:

Physical and optical properties	
transmission Range	0.17 to 5.5um
Refractive Index	No 1.75449; Ne 1.74663 @ 1.06um
Reflection Loss	14% @ 1.06um
Absorption Coefficient	$0.3 \times 10^{-3} \text{cm}^{-1}$ @2.4um
Reststrahlen Peak	13.5um
dn/dT	$13.1 \times 10^{-6}$ @ 0.546um
dn/du = 0	1.5 um
Density	3.97 g/cc
Melting Point	2040
Thermal Conductivity	27.21 W m <sup>-1</sup> K <sup>-1</sup> @ 300K
Thermal Expansion	5.6 (para) & 5.0 (perp) x 10 <sup>-6</sup> /K
Hardness	Knoop 2000 with 2000g indenter
Specific Heat Capacity	763 J Kg <sup>-1</sup> K <sup>-1</sup> @ 293K
Dielectric Constant	11.5 (para) 9.4 (perp) @ 1MHz
Youngs Modulus (E)	335 GPa
Shear Modulus (G)	148.1 GPa
Bulk Modulus (K)	240 GPa
Elastic Coefficients	C11=496 C12=164 C13=115 C33=498 C44=148
Apparent Elastic Limit	300MPa (45,000 psi)
Poisson Ratio	0.25
Solubility	98x10 <sup>-6</sup> g/100g water
Molecular Weight	101.96
Class/Structure	trigonal (hex), R3c