Lanthanum Fluoride (LaF_3)

Lanthanum Fluoride is grown as small ingots of about 10mm diameter as it is difficult to anneal. Doped with Europium, it is a pale yellow colour.

APPLICATIONS: Lanthanum Fluoride is not often used as an optical material. Lanthanum Fluoride is usually doped with Europium at a nominal level of 0.3% mole. In this form, the usual application is as the active element in an ion-selective electrode for the detection and measurement of Fluoride ions in solution. Use the QR link on page 30 for application notes on ion-selective electrodes.

Transmission Range	0.2 to 11µm
Refractive Index	No 1.506 at 0.55µm
Reflection Loss	10.3% at 0.55µm
Absorption Coefficient	n/a
Reststrahlen Peak	n/a
dn/dT	n/a
$dn/d\mu = 0$	n/a
Density	5.94 g/cc
Melting Point	1493 °C (1)
Thermal Conductivity	5.1 W m^{-1} K^{-1} at 300K
Thermal Expansion	$11.0x10^{-6}$ (para) $15.8x10^{-6}$ /K(perp) at 298K (2)
Hardness	Moh 4.5
Specific Heat Capacity	506 J Kg^{-1} K^{-1}
Dielectric Constant	14 (3)
Youngs Modulus (E)	n/a
Shear Modulus (G)	n/a
Bulk Modulus (K)	n/a
Elastic Coefficients	n/a
Apparent Elastic Limit	n/a
Poisson Ratio	n/a
Solubility	Insoluble in water
Molecular Weight	195.9
Class/Structure	Trigonal (hex), $P6_3/mcm$ (2), no cleavage

1) Jones and Shand, J.Crys.Growth. **2** (1968) p361
(2) Sher, Solomon, Lee, and Meuller. Phys.Rev. **144**, p593 (1966)
(3) Electronic Processes in Ionic Crystals (OU Press, NY, 1940) p.41.

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µm	No	Ne	µm	No	Ne
0.254	1.656	1.649	0.405	1.618	1.612
0.436	1.617	1.609	0.547	1.606	1.602