

ALEXANDRITE

Among solid-state laser crystals, Alexandrite is the most suitable for a wide range of medical applications due to its physical properties, such as the lasing wavelength and tunability. In fact, Alexandrite is the first of a class of tunable solid-state laser materials. It features a broad tuning wavelength range, 710 - 800 nm, with capability to store/efficiently extract multi-J energy pulses.

It is one of the most robust solid-state laser materials available with a thermal shock resistance five-times that of Nd:YAG.

Alexandrite's combination of properties offer application in Medical / Aesthetic and other fields, in such areas as: dermatology, lithotripsy, dental, spectroscopy, atmospheric lidar, testing of fiber optics and photodetectors, materials processing, pumping of dye lasers, non-linear optics studies and annealing of semiconductors.

Typical applications include laser-assisted hair removal, leg vein reduction and tattoos removal: as matter of fact Alexandrite is becoming the material of choice for a variety of aesthetic dermatology.

Alexandrite lasers emit at a wavelength of 755 nm, that is well within the absorption spectrum of melanin, and this makes the laser perfectly suitable for removing hair. The absorption by melanin in the skin results also in hypopigmentation, enabling the use of these lasers for treatment of pigmented lesion, such as removal of green-blue-black tattoos, brown pigment spots, lentigines and age spots.

Ultra-pure gas and superior raw material purity, together with a tightly controlled proprietary process, allow Opto Materials to proudly offer premium grade Alexandrite crystal rods with low losses and higher efficiency.

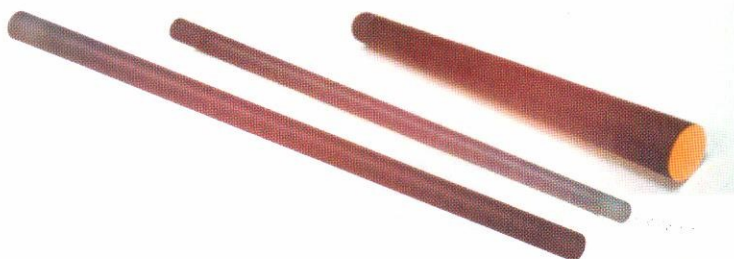
Cr concentration uniformity along each rod is achieved by using only a small portion (about 20%) of the melt. A very uniform Cr profile is certified for each boule, that is also marked with laser for identification.

In-house coating allows a short cycle time after end polishing, assuring high adherence and contamination-free layers.



General Features

- Low losses and superior lasing efficiency
- Certified Cr concentration uniformity
- Low wavefront distortion
- Multiple specifications on sizes
- Guaranteed traceability through laser marking
- Long term stability
- AR broad band coating @755 ± 50 nm



Material Specifications

Physical Properties	
Cr doping level	0.01 – 0.2 at%
Chemical formula	Be (Al _{1-x} Cr _x) ₂ O ₄
Primary diode pump band	594 nm
Molecular weight	127.01 g/mole
Crystal structure	Orthorhombic
Lattice constants	a = 5.476 Å
	b = 9.404 Å
	c = 4.427 Å
Melting point	1870 °C
Density	3.67 g/cm ³
Mohs hardness	8.5 @ 20 °C

Optical Properties	
Refractive index	E a: 1.7367
	E b: 1.7421
	E c: 1.7346
Lasing wavelengths	710-800 nm
Primary diode pump band	594 nm

Thermal Properties	
Thermal conductivity	0.23 W/(cm•K)
Specific heat	0.59 J/(g•K)
Linear expansion coefficient	a: 5.9×10 ⁻⁶ / K
	b: 6.1×10 ⁻⁶ / K
	c: 6.7×10 ⁻⁶ / K
Dissipative fracture limit	35 - 74 W/cm
Young modulus	469 GPa