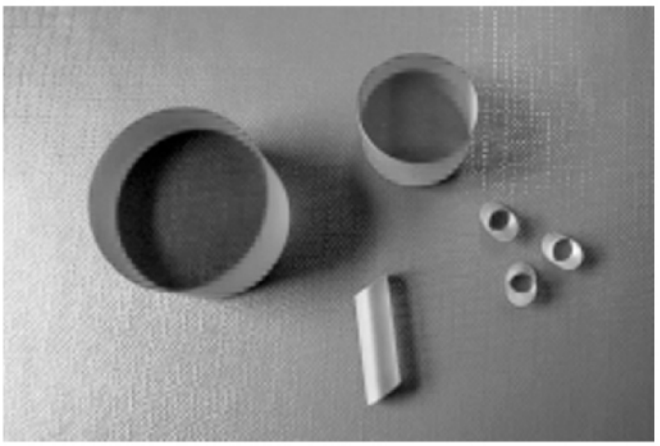
Ti:Sapphire

Titanium Doped Sapphire

Al_2O_3:Ti^{3+}-titanium-doped sapphire crystals combine supreme physical optical properties with broadest lasing range.

It's indefinitely long stability and useful lifetime added to the lasing over entire band of 660-1050nm challenge " dirty" dyes in variety of applications. Medical laser systems, lidars, laser spectroscopy, direct femtosecond pulse generation by Kerr-type mode-locking-there are few of existing and potential applications.

The absorption band of Ti:Sapphire centered at 490 nm makes it suitable for variety of laser pump sources-argon ion, frequency doubled Nd:YAG and YLF, copper vapour lasers. Because of 3.2 μs fluorescence lifetime Ti:Sapphire crystals can be effectively pumped by short pulse fishlamps in powerful laser system.

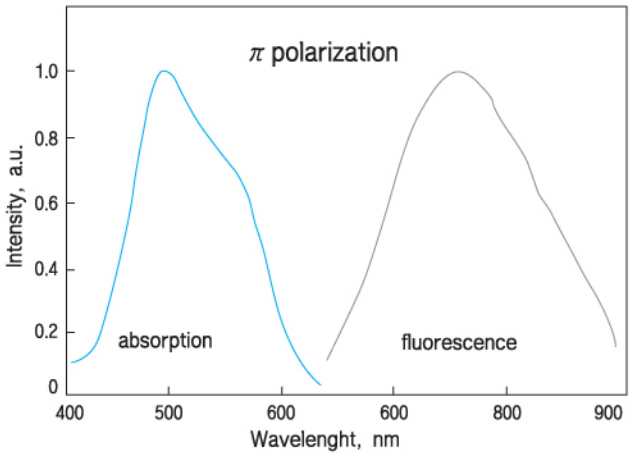


Specifications

Orientation	Optical axis C normal to rod axis
Ti_2O_3 concentration	0.03-0.25 wt %
Figure of Merit	>150 (>300 available on special requests)
Size	up to 20mm dia and up to 130mm length
End configurations	Flat/Flat or Brewster/Brewster ends
Flatness	λ /10 @ 633nm
Parallelism	10 arcsec
Surface Finishing	10/5 scratch/dig
Wavefront distortion	λ /4 inch

Material Physical and Laser Properties

Chemical Formula	Ti^{3+}:Al_2O_3
Crystal Structure	Hexagonal
Lattice constants	a=4.748, c=12.957
Density	3.98 g/cm^3
Mohs Hardness	9
Thermal Conductivity	0.11 cal/(℃×sec×cm)
Specific heat	0.10 cal/g
Melting Point	2050 ℃
Laser action	4-Level Vibronic
Fluorescence lifetime	3.2 μsec (T=300K)
Tuning range	660 - 1050 nm
Absorption range	400 - 600 nm
Emission peak	795 nm
Absorption peak	488 nm
Refractive index	1.76 @ 800 nm



Ti_2O_3 wt %	a @ 490 nm cm^{-1}	a @ 514 nm cm^{-1}	a @ 532 nm cm^{-1}
0.03	0.7*	0.6	0.5
0.05	1.1	0.9	0.8
0.07	1.5	1.3	1.2
0.1	2.2	1.9	1.7
0.12	2.6	2.2	2.0
0.15	3.3	2.8	2.5
0.2	4.3	3.7	3.4
0.25	5.4	4.6	4.1

* Presented values are given with ±0.05 cm^{-1} accuracy.