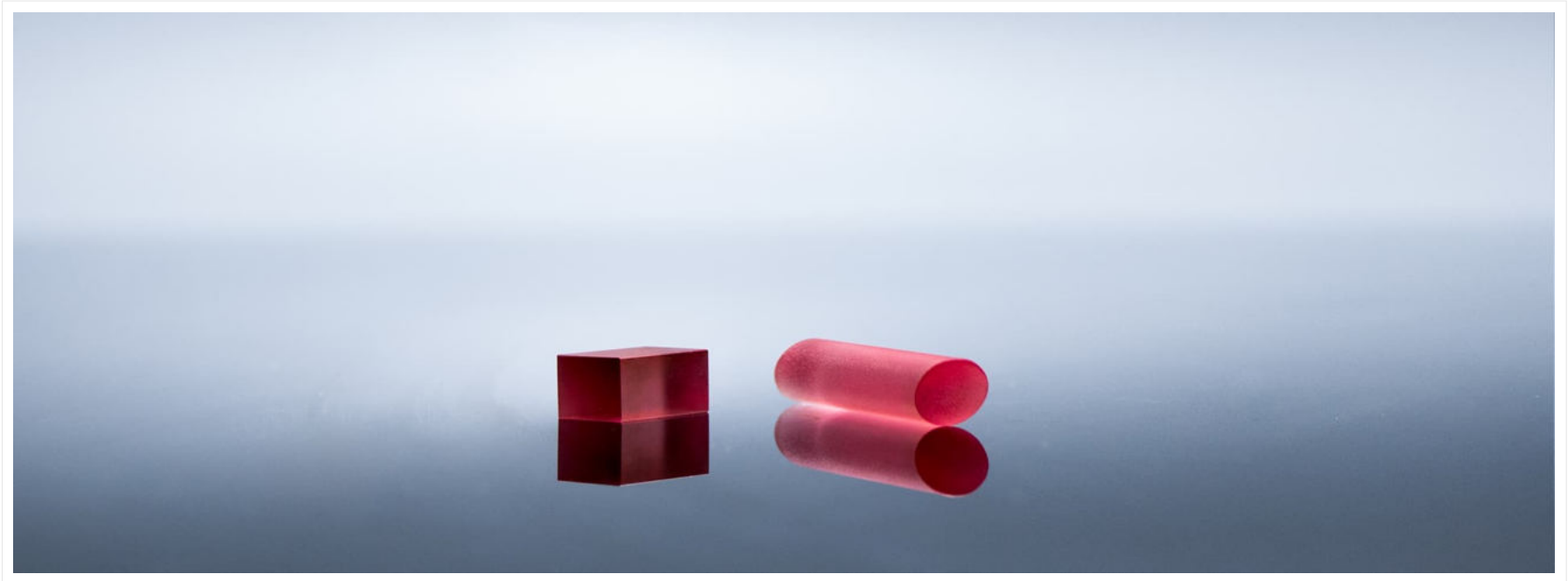


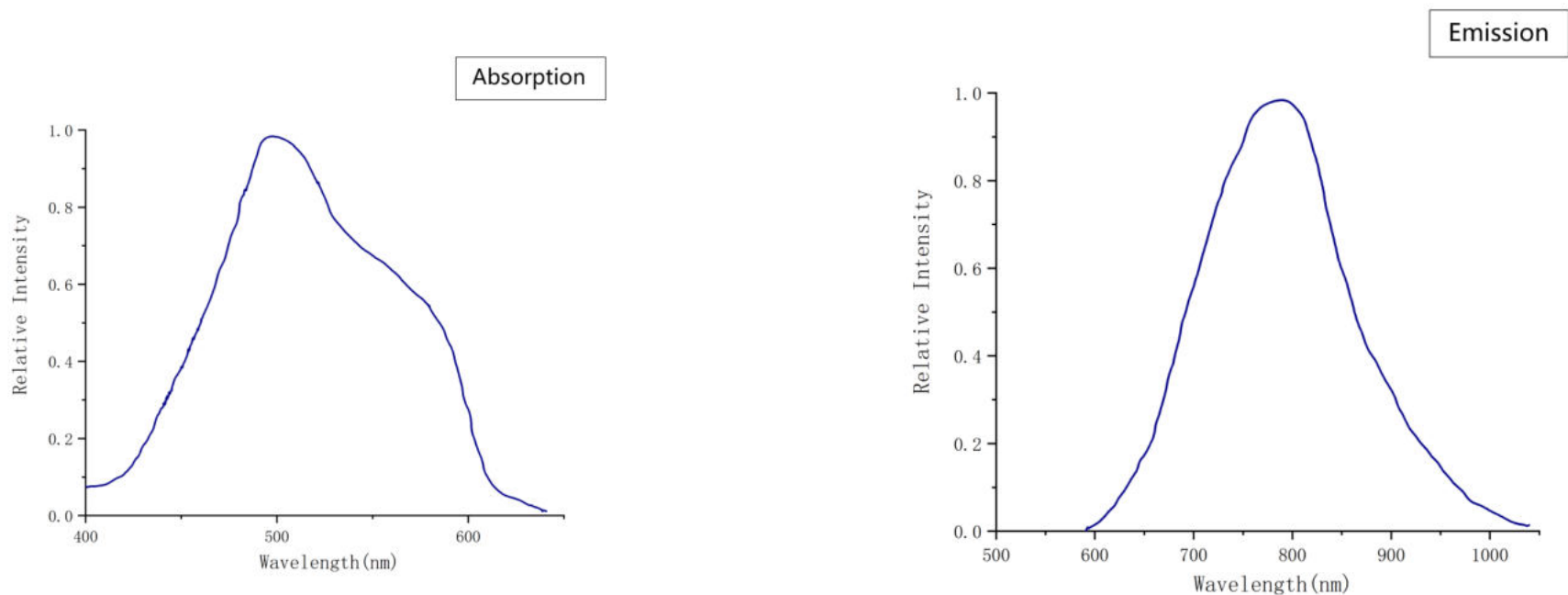
Ti:Sapphire



DESCRIPTION

Titanium-doped sapphire (Ti³⁺:sapphire) as an optically pumped, solid-state laser crystal is widely used in wavelength tunable laser which tunable range is 650-1100nm, and peaking at 800nm, it is one of the widest wavelength tunable laser crystal. The upper-state lifetime of Ti:sapphire is short to 3.2ms, because of high saturation power, it's hard to pump it by lamp, argon ion lasers or frequency-doubled Nd:YAG laser etc. is usually adapted. Using self-mode-locking technology, the Ti:Sapphire laser can output laser pulse with pulse width as short as 6.5fs directly, which is the narrowest laser pulse of all lasers that directly output from the resonant cavity. Through frequency-double technology, the wavelength of laser beam can cover wide band from blue to deep ultraviolet, produced 193 nm laser has been used in lithography machine.

SPECTRA



PARAMETER

Material and Specifications

Materials	Ti ³⁺ :Al ₂ O ₃
Concentration	(0.05~0.35) wt%
Orientation	A-Axis within 5°, E-vector parallel to C-Axis
Parallelism	30"
Perpendicularity	5'
Figure of Merit(FOM)	100~300
Wavefront Distortion	< $\lambda/4$ @632 nm
Surface Flatness	< $\lambda/8$ @632 nm
Clear Aperture	>90%
Surface Quality	10-5(MIL-PRF-13830B)
Coatings	Standard coating is AR with R < 5.0% each face @532 nm and R < 0.5% each face, from 650 nm to 850 nm. Custom coatings
Chamfer	<0.2×45°

Physical and Chemical Properties

Crystal Structure	Hexagonal
Density	3.98 g/cm ³
Melting Point	2040 °C
Thermal Conductivity	33 W / (m K)
Temperature dependence of refractive index	$13 \times 10^{-6}K^{-1}$
Thermal shock resistance parameter	790 W/m
Thermal Expansion	$\approx 5 \times 10^{-6}K^{-1}$
Hardness (Mohs)	9
Young`s Modulus /GPa	335
Specific heat	0.1 cal/g
Tensile Strength/Mpa	400
Diameter	4-12mm
Ti density for 0.1% at. doping	$4.56 \times 10^{19}cm^{-3}$

FEATURES

- Wide wavelength tunability
- Broad absorption pump band
- Preeminent output efficiency
- Short upper-state lifetime(3.2 ns)
- Narrow locked mode width
- High damage thresholdExcellent thermal conductivity

APPLICATIONS

- 800nm Laser
- fs Laser

Optical and Spectral Properties

Laser Transition	F _{3/2} →F _{1/2}
Laser Wavelength	660-1200 nm
Central emission	800 nm
Turnable Absorption Band	400-600 nm
Absorption peak	488 nm
Emission Cross Section @ 790 nm	$41 \times 10^{-20} cm^2$
Fluorescence Lifetime	3.2 ns
Emission Linewidth	650-1100 nm
Refractive Index @633 nm	1.77@ 532 nm; 1.76@800 nm; 1.75@1100 nm
Absorption Coefficient	0.5~6.0 cm ⁻¹

