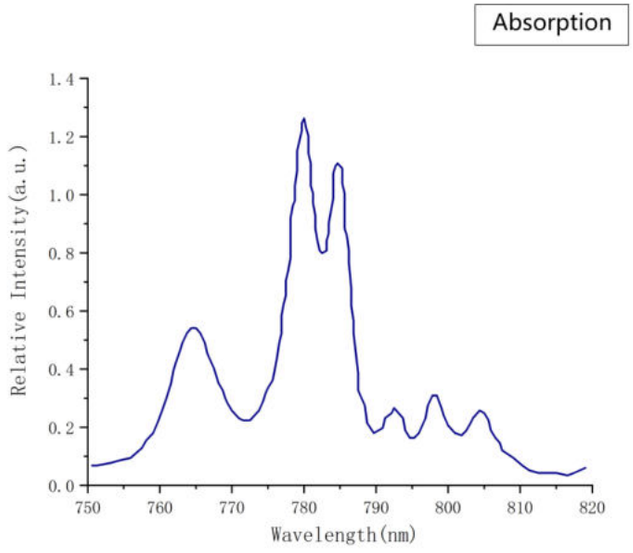
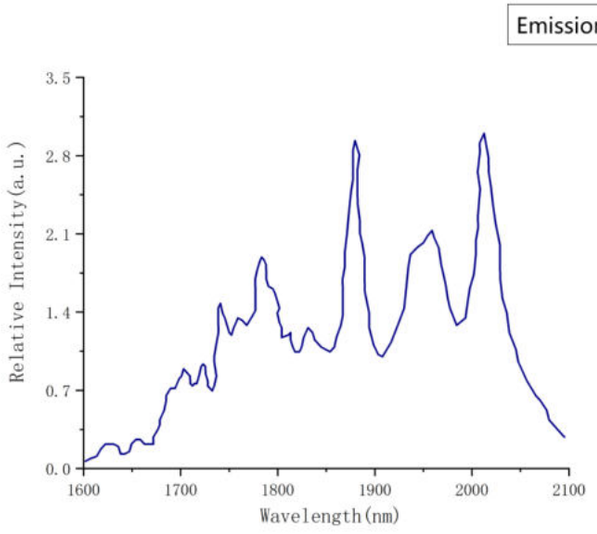
# Tm:YAG

## DESCRIPTION

Tm: YAG operating on the 3H4 –3H6 transition in the 0.82 μm wavelength range. It can be pumped with efficient diode lasers in the 0.78 – 0.8 μm wavelength range. The transition has a small quantum defect for low thermal dissipation. The upper state lifetimes can be long, on the order of a millisecond for good energy storage. It also has sufficient gain bandwidth to support sub-ps-long pulses depending on the host material and temperature of operation. Compared with the single crystal material, the transparent ceramic materials combine the advantages of single crystals and glasses. The transparent ceramic materials are fabricated by solid-state reaction and vacuum sintering. So, they not only possess good optical and thermal properties as fine as single crystals, but also can be fabricated with large size, high concentration. Furthermore, they also have other superiorities, such as short fabrication period, less cost, and multifunctional samples.

## SPECTRA




www.laser-crylink.com
sales@crylink.com
+86-21-66566068
Building 7, No.718 Baoqi Road, Baoshan District, Shanghai, China

## PARAMETER

### Material and Specifications

| | |
|---|---|
| Tm Concentration Tolerance | Tm:0.5~5at% |
| Orientation | [111], <5º |
| Parallelism | ≤10″ |
| Perpendicularity | ≤5′ |
| Surface Quality | 10-5 (MIL-O-13830A) |
| Wavefront Distortion | ≤ 0.125λ/25 mm @632.8nm |
| Surface Flatness | λ/8@632nm |
| Clear Aperture | >95% |
| Chamfer | 0.15±0.05mm |
| Size | D: 2~10mm, L: 3~150mm |
| Coatings | AR: ≤0.25% @2μm |

## FEATURES

- High quantum efficiency
- High efficiency with LD pump
- Long upper state lifetime
- Sufficient gain bandwidth
- Small quantum defect
- High damage threshold

## APPLICATIONS

- 2000nm laser

### Physical and Chemical Properties

| | |
|---|---|
| Crystal Structure | Cubic |
| Lattice Constants | 12.01 |
| Density | 4.56±0.04g/cm3 |
| Melting Point | 1970℃ |
| Thermal Conductivity | 14W/m/K@20℃; 10.5W/m/K@100℃ |
| Specific Heat | 0.59(J/g. cm3@0-20℃) |
| Thermal Optical Coefficient(dn/dT) | 7.3×10-6/K |
| Thermal Expansion | [100]: 8.2×10-6/K@0~250℃ |
| | [110]: 7.7×10-6/K@0~250℃ |
| | [111]: 7.8×10-6/K@0~250℃ |
| Hardness (Mohs) | 8.5 |
| Young`s Modulus | 3.17×104Kg/mm2 |
| Shear Modulus | 310GPa |
| Extinction Ratio | ≥ 25dB @632.8nm |
| Tensile Strength/Gpa | 0.13~0.26 |
| Poisson Ratio | 0.25 |
| Thermal Shock Resistance | 790W/m |

### Optical and Spectral Properties

| | |
|---|---|
| Laser Transition | 3F4→3H6 |
| Laser Wavelength | 1.87~2.16μm |
| Absorption Cross Section | 7.5×10-21cm2 |
| Diode Pump Band | 785nm, 680nm |
| Emission Cross Section@2013nm | 2.9×10-20 cm2 |
| Fluorescence Lifetime | 11ms |
| Refractive Index @632nm | 1.83 |

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