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Er:Cr:YSGG - Erbium, Chromium Co-doped Yttrium Scandium Gallium Garnet

Introduction

Erbium, Chromium doped Yttrium Scandium Gallium Garnet (Er:Cr:YSGG) provides an efficient laser crystal for generating 2800 nm light in an important water absorption band. It becomes one of the most promising laser crystals recently owing to its high conversion efficiency, stable chemical properties, long fluorescent lifetime. Now Er:Cr:YSGG is widely used in dentistry, environmental researching, optical communication, remote sensing technology and military etc.

CASTECH's laser crystal Er:Cr:YSGG is featured by

- Lowest threshold and highest slope efficiency of common Erbium doped crystals
- High conversion efficiency
- Operates CW, free-running or Q-switched
- high optical quality
- The intrinsic crystal disorder increases pump line widths and tenability
- Can be flash lamp pumped via Cr bands or diode pumped via Er bands
- Long fluorescent lifetime

Table 1. Basic Properties

Crystal Structure	Cubic, Garnet
Chemical Formula	$Y_{2.93}Sc_{1.43}Ga_{3.64}O_{12}$
Lattice Parameter	12.42 Å
Doping Consent	Cr: 0.5 × 10^{20} (at/cm^3)，Er: 4 × 10^{21} (at/cm^3)
Growth Method	Czochralski
Density	5.67 g/cm^3 (Cr & Er doped)
Refractive Index	1.92 @1000 nm
Thermal Expansion Coefficient	8.1 × 10^{-6}/K
Thermal Conductivity	8 (W/m/K)
Mohs Hardness	8 Mohs
Thermo-optical Factor (dn/dT)	12.3 × 10^{-6} /K
Emission Cross-section	5.2 × 10^{-21} cm^2
Fluorescent Lifetime	1400 μs

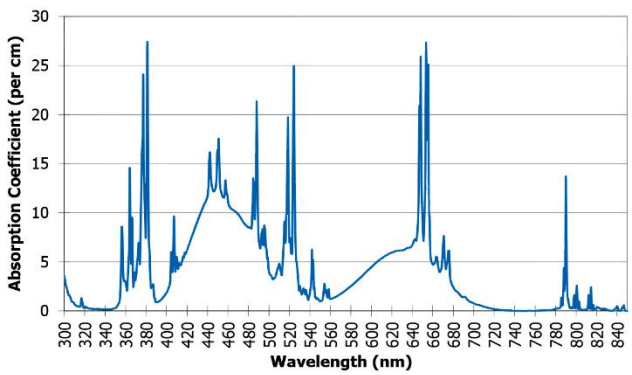

Figure 1. Er:Cr:YSGG absorption coefficient