



Glass Products Division

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REAI™ Glass Technology enabling high gain, high bandwidth optical communications devices

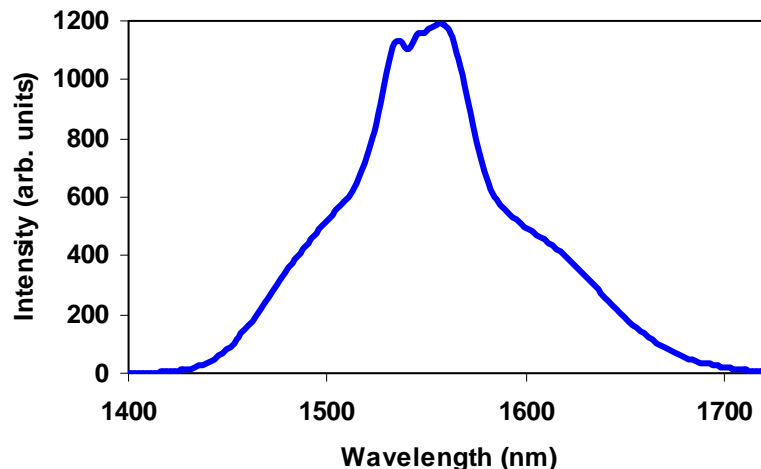
REAI™ Glass doped with erbium or co-doped with erbium/ytterbium has good working characteristics and enables small, high power density devices operating in the 1550 nm waveband. The glasses exhibit long fluorescence lifetime, on the order of 5 ms, for the $^4I_{13/2}$ excited state of Er^{3+} for dopant concentrations of 5 mole %. The -3dB bandwidth is ca. 75 nm, centered around 1570 nm. The glasses are targeted to small device applications in Planar Lightwave Circuits and optical amplifiers. CRI is seeking development partners to introduce the new device products to established markets and expand the application of small optical communications laser and amplifier devices.

MARKETS

The customer need satisfied by the CRI's REAI™ Glass technology is enabling small, high bandwidth optical devices for communications applications.

FEATURES

Fluorescence cross section line shape for erbium-doped REAI™ Glass material. The full width half maximum (-3dB) bandwidth is ~75 nm centered around 1570 nm. >



Using REAI™ Glass for the gain medium in a power laser provides potential advantages over other glasses. Advantages include:

- High dopant concentrations with long fluorescence lifetimes
- Large bandwidth
- GSA cross section at 980 nm = $2 \times 10^{-21} \text{ cm}^2$
- Mechanically, thermally and environmentally stable material



< Erbium-doped REAI™ Glass as-cast rod. REAI™ Glass is available in a variety of forms including rods, slabs, disks and fibers.

The glass composition and properties can be optimized to meet specific application requirements.

Selected properties of REAI™ Glass

Property	Range of values
Major components	Al ₂ O ₃ , RE ₂ O ₃ *, 0-35 mole % SiO ₂
Solubility of rare earth oxides	Up to 50 mole % RE ₂ O ₃
Infrared transmission	4000 to 5000 nm
Fluorescence lifetime of ⁴ I _{13/2} state in Er ³⁺	~ 5 ms at 5 mole % Er ₂ O ₃
Refractive index (n _D , λ = 589 nm)	1.7-1.8
Abbe number	40-60
Hardness	800-1000 Vickers
Devitrification temperature	1000-1100 °C
Thermal expansion coefficient	~10 x 10 ⁻⁶ /°C
Thermal conductivity	0.01 W/cm.K
Density	3.4-4.1 gram per cm ³
Young's modulus	110-135 GPa
Chemical stability (in water at 90 °C)	Excellent, dissolution <1 x 10 ⁻⁸ g/cm ² /min

*Oxides of elements: Sc, Y, La, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu.
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Additional Information

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Products available exclusively from CRI