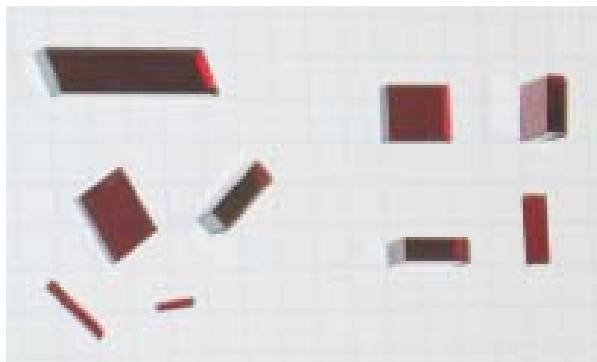


## Cr<sup>2+</sup>:ZnSe and Cr<sup>2+</sup>:ZnS LASER ACTIVE MATERIALS

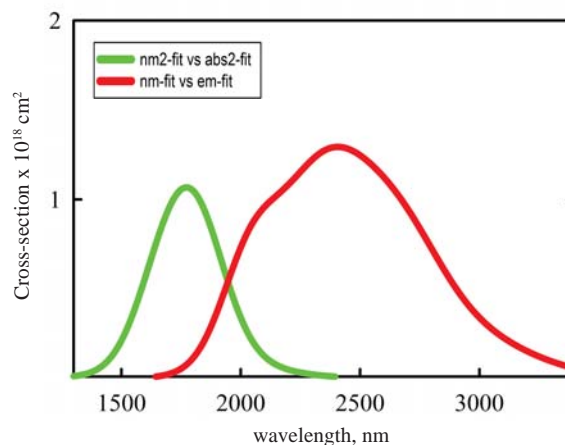
The unique combination of available pump sources (Er-fiber, Tm fiber, telecom or InP diodes, Er:YAG/YLF; Tm:YAG/YLF), technological (low cost ceramic material), optical and spectroscopic characteristics (ultrabroadband gain bandwidth, high  $\sigma\tau$  product and high absorption coefficients) make them the gain materials of choice when one needs a compact system with continuous tunability at 300 K over 1.9-3.3  $\mu\text{m}$ , output powers up to 13 W, and high (up to 70%) conversion efficiency.

Cr<sup>2+</sup>:ZnSe/S lasers are promising for spectroscopy, sensing, medical and defense related applications, as well as for seeding or pumping middle-infrared optical parametric oscillators.

IPG's fabrication process allows low cost mass production of a large variety of diffusion-doped Cr<sup>2+</sup>:ZnSe/ZnS crystals with low losses, uniform distribution of chromium, good reproducibility and reliability.



Uniformly-doped 5x5x20 mm  
Cr:ZnSe Crystals



Cr:ZnSe Cross-sections of  
Absorption and Emission

### Output Characteristics of Cr:ZnSe/S Lasers Based on IPG's Gain Materials

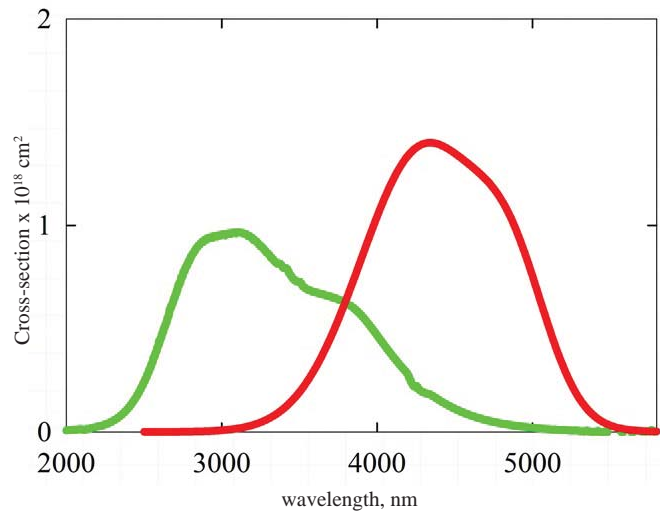
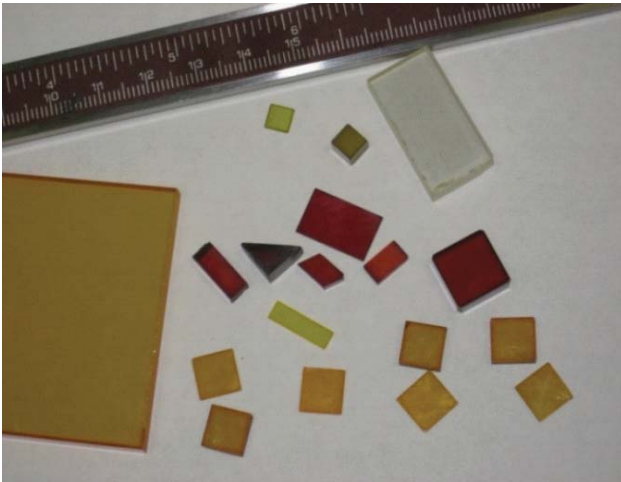
LASER CHARACTERISTICS	OUTPUT PARAMETER
CW, Output Power, W	12
CW, Tuning Range, nm	1950-3300
CW, Efficiency, %	60
CW, Microchip, Output Power, W	3
CW, Hot-Pressed Ceramic Laser, W	0.25
CW, Multiline Operation	40 lines over 2.4-2.6 $\mu\text{m}$
Pulsed Microchip, Energy, mJ	1
Gain-switched, Energy, mJ	20 @ 15 ns
Mode-locked, Duration, fs	500 @ 50 mW

## Fe<sup>2+</sup>:ZnSe Laser Active Materials

Fe<sup>2+</sup>:ZnSe crystals are ideal gain materials for room temperature gain-switched lasers tunable over 3.9-5.1 μm spectral range.

These lasers are promising for spectroscopy, sensing, medical and defense related applications, as well as for seeding or pumping middle-infrared optical parametric oscillators.

IPG's fabrication process allows low cost mass production of a large variety of diffusion-doped Fe<sup>2+</sup>:ZnSe/ZnS crystals with low losses, uniform distribution of iron, good reproducibility and reliability.



### State-of-the-art Fe:ZnSe Laser Characteristics

Laser Characteristics	Output Parameter
Pulsed @ 77 K, Energy, mJ	420
Pulsed, Efficiency, %	43
Microchip gain-switched @ 300 K, Energy, μJ	1 @ 5 ns
Gain-switched @ 300 K, Energy, mJ	5 @ 20 ns
Pulsed, Efficiency @ 300 K, %	20
Gain-switched @ 300 K, Tunable Range, nm	3950-5050

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