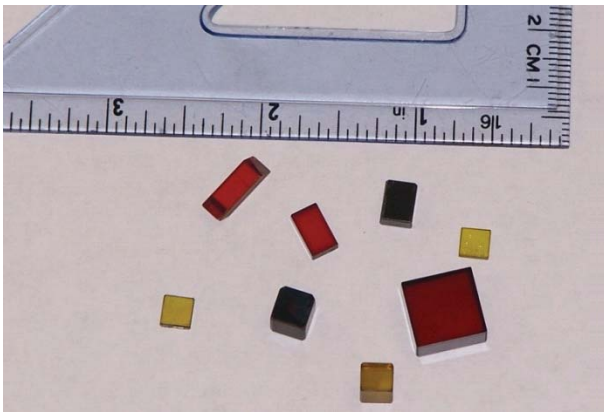
PASSIVE Q-SWITCHES

Co^{2+}:ZnS, Cr^{2+}:ZnS and Cr^{2+}:ZnSe PASSIVE Q-SWITCHES

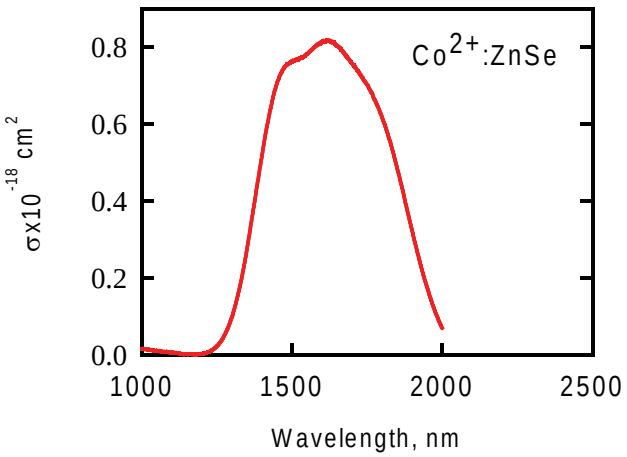
Co^{2+}:ZnS, Cr^{2+}:ZnS and Cr^{2+}:ZnSe saturable absorbers (SA) are ideal materials for passive Q-switches of eye-safe fiber and solid-state lasers operating in the spectral range of 1.5-2.1 μm.

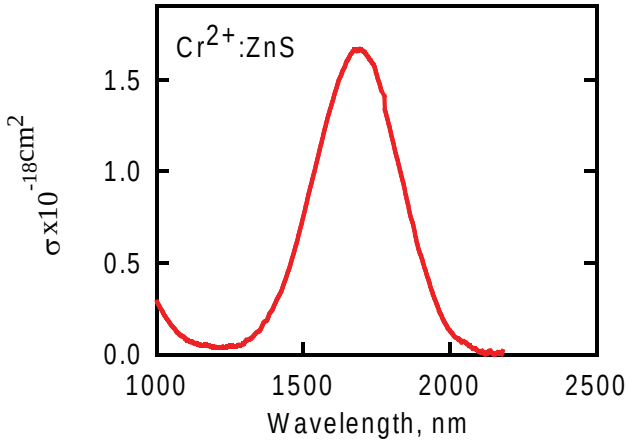
These lasers are used in numerous applications, such as free-space communication systems, target designation, time-of-flight range finding, surgery, reflectrometry, laser lidars, etc.

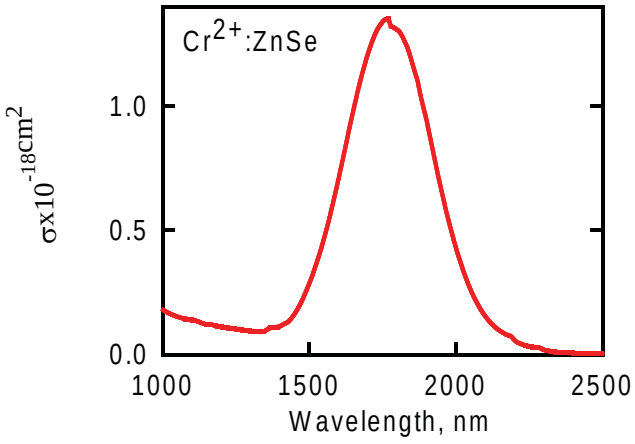
IPG offers a large variety of diffusion-doped Co^{2+}:ZnS, Co^{2+}:ZnSe, Cr^{2+}:ZnS and Cr^{2+}:ZnSe polycrystals appropriate for Q-switching of the lasers operating in the 1.5-2.1 μm spectral range.



Samples of Cr^{2+}: ZnS, Cr^{2+}:ZnSe and Co^{2+}:ZnS Saturable Absorbers







Ground-state Absorption Cross-sections of the Co^{2+}:ZnS, Cr^{2+}:ZnS and Cr^{2+}:ZnSe Crystals

Co^{2+}:ZnS, Cr^{2+}:ZnS and Cr^{2+}:ZnSE Passive Q-Switches

Cryststallographic	ZnS	ZnSe
Syngony	Cubic	Cubic
Symetry Class	---	43 m

Mechanical	ZnS	ZnSe
Density, g/cm^3	4.09	5.27
Young Modulus, Pa	7.45×10^{10}	7.03×10^{10}
Poisson Ration	0.28	0.28

Thermal	ZnS	ZnSe
Thermal Expansion, dec C^{-1}	6.5×10^{-6}	7.6×10^{-6}
Thermal Conductivity, W/(m deg C)	27.2	16
Specific Heat, J/(kg dec C)	0.515×10^3	0.339×10^3

Optical	ZnS	ZnSe
Refractive Index at 1.0 µm	2.29	2.49
dn/dt, deg C^{-1} $_{01/11}$	5.4×10^{-5}	6.1×10^{-5}
Transmission Range, µm	0.37-14	0.55-20

Q-switching	Cr:ZnS	Cr:ZnSe	Co:ZnS	Co:ZnSe
σ_{GSA} (at 1.54 µm)	1.6×10^{-18}	1.3×10^{-18}	0.7×10^{-18}	0.76×10^{-18}
σ_{ESA} (at 1.54 µm)	0	0.02×10^{-18}	0.1×10^{-18}	0.1×10^{-18}
τ (at 1.54 µm)	5 µs	8 µs	200 µs	290 µs

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