

Passive Q-switches

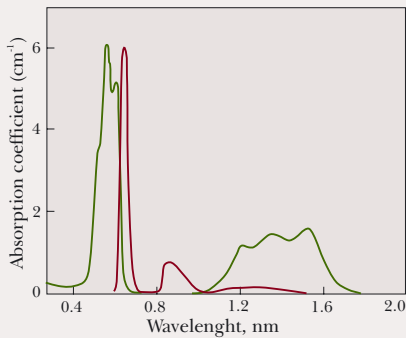


Figure 1.
Absorption spectra of the $\text{Co}^{2+}:\text{MgAl}_2\text{O}_4$ crystal

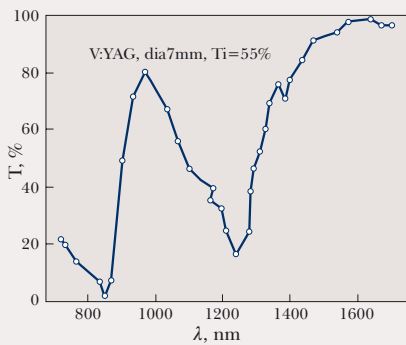


Figure 2.
Transmission spectra of $\text{V}^{3+}:\text{YAG}$ crystal with $\text{Ti} = 55\%$ @ 1.34 micrometers

EKSPLA offers a wide choice of solid-state saturable absorbers such as: $\text{Co}^{2+}:\text{MgAl}_2\text{O}_4$, $\text{Cr}^{4+}:\text{YAG}$, $\text{V}^{3+}:\text{YAG}$.

$\text{Co}^{2+}:\text{MgAl}_2\text{O}_4$ is a relatively new material for passive Q-switching in lasers emitting from 1.2 to 1.6 micrometers, in particular, for eye-safe 1.54 micrometers Er:glass laser, but also works at 1.44 micrometers and 1.34 micrometers wavelengths. High absorption cross section ($3.5 \times 10^{-19} \text{ cm}^2$) permits Q-switching of Er:glass laser without intracavity focusing both with flash-lamp and diode-laser pumping. Negligible excited-state absorption results in high contrast of Q-switch, i.e. the ratio of initial (small signal) to saturated absorption is higher than 10 (Figure 1).

$\text{Cr}^{4+}:\text{YAG}$ is one of the best passive Q-switch for high power lasers emitting at $\sim 1 \mu\text{m}$ wavelength. Standard diameter apertures – 5, 8, 9.5 mm and various initial transmission (or optical density) are available upon request. Also $\text{Cr}^{4+}:\text{YAG}$ laser rods for ultra-short pulse solid-state lasers are available.

$\text{V}^{3+}:\text{YAG}$ is relatively new material for passive Q-switch. Crystal has working wavelength range from 1 micrometers to 1.45 micrometers. Typical application – Q-switch, for lasers emitting at 1.34 micrometers wavelength (Figure 2).

Finally, excellent optical, mechanical, and thermal properties of the crystals give an opportunity to design compact and reliable laser sources with these passive Q-switches.

Fe:ZnSe, Cr:ZnSe, Co:ZnS solid-state saturable absorbers also are available upon request.

REFERENCES

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SPECIFICATION

	$\text{Co}:\text{MgAl}_2\text{O}_4$	$\text{Cr}^{4+}:\text{YAG}$	$\text{V}^{3+}:\text{YAG}$
Working wavelength range, micrometers	1.2 – 1.6	0.8 – 1.2	1 – 1.45
Absorption cross-section, cm^2	3.5×10^{-19} (at 1.54 micrometers)	5×10^{-18} (at 1.06 micrometers)	7.3×10^{-18} (at 1.34 micrometers)
Initial transmittance, %	30-99	20-99	40-99
Aperture, mm	5-12	5, 8, 9.5	4-10
Thickness, mm	1-5	1-5	1-10
Coatings*	AR @ 1.54 micrometers, R<0.2%	AR @ 1.06 micrometers, R<0.15%	AR @ 1.34 micrometers, R<0.2%

Please feel free to contact EKSPLA for your application details.



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