

Passive Q-switches

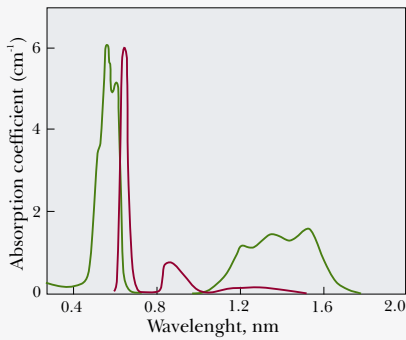


Figure 1.
Absorption spectra of the $\text{Co}^{2+}:\text{MgAl}_2\text{O}_4$ crystal

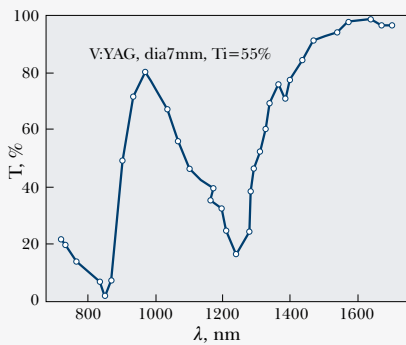


Figure 2.
Transmission spectra of $\text{V}^{3+}:\text{YAG}$ crystal with $\text{Ti} = 55\%$ @ $1.34 \mu\text{m}$

REFERENCES

1. K.V.Yumashev, I.A.Denisov, N.N.Posnov, P.V.Prokoshin, V.P.Mikhailov Nonlinear absorption properties of $\text{Co}^{2+}:\text{MgAl}_2\text{O}_4$ crystal. – Appl. Phys. B 70, 179-184 (2000)
2. V.G.Shcherbitsky, S.Girard, M.Fromager, R.Moncorge, N.V.Kuleshov, V.I.Levchenko, V.N.Yakimovich, B.Ferrand. – Appl. Phys. B74, 367-374 (2002)
3. A.V.Podlipensky, K.V.Yumashev, N.V.Kuleshov, H.M.Kretschmann, G.Huber. Passive Q-switching of 1.44 nm and 1.34 nm diode-pumped Nd:YAG lasers with a V:YAG saturable absorber, - Appl. Phys. B76, 245-247 (2003)
4. A.M.Malyarevich, I.A.Denisov, K.V.Yamashev, V.P.Mikhailov, R.S.Conroy, B.D.Sinclair. V:YAG – a new passive Q-switch for diode-pumped solid-state lasers.- Appl. Phys. B67, 555-558 (1998)

EK SMA Co. 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 μm , in particular, for eye-safe 1.54 μm Er:glass laser, but also works at 1.44 μm and 1.34 μm 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 μm to 1,45 μm . Typical application – Q-switch, for lasers emitting at 1.34 μm 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.

SPECIFICATION

	$\text{Co}:\text{MgAl}_2\text{O}_4$	$\text{Cr}^{4+}:\text{YAG}$	$\text{V}^{3+}:\text{YAG}$
Working wavelength range, μm	1.2 – 1.6	0.8 – 1.2	1 – 1.45
Absorption cross-section, cm^2	3.5×10^{-19} (at 1.54 μm)	5×10^{-18} (at 1.06 μm)	2.8×10^{-18} (at 1.34 μm)
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 μm , R<0.2%	AR @ 1.06 μm , R<0.15%	AR @ 1.34 μm , R<0.2%

Please
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application details