SELECTED PUBLICATIONS

1. Timing Jitter Control of a Passively Q-Switched Nd:YVO₄/Cr⁴⁺:YAG Laser by the Use of a Coupled Cavity

Timing jitter was measured in Nd:YVO₄/Cr:YAG passively Q-switched laser. Primary results with coupled cavity as shown in Figure 2 showed reduction of timing jitter by one order of magnitude down to 450 ns (2σ value), 40 µJ pulse energy and 2.5 ns pulse duration.

![Figure 2. Schematic view of the Nd:YVO₄/Cr⁴⁺:YAG passively Q-switched laser.](image)

2. Highly Accurate Interferometric Evaluation of Thermal Expansion and dn/dT of Optical Materials

Thermo-mechanical and optical properties of Y₃Al₅O₁₂ (YAG), YVO₄, and GdVO₄ were evaluated with high accuracy. Evaluation procedure that was established by authors enabled to suppress evaluation errors less than 2%, by means of the detection of temperature deviations in interferometric fringes on transmittance as shown in Figure 3.

![Figure 3. Temperature dependence of interferometric fringes in Nd:YVO₄.](image)

Measured thermal expansion coefficient for YAG, [100]-YVO₄, [001]-YVO₄, [001]-GdVO₄, and [001]-GdVO₄ were 6.13, 1.76, 8.24, 1.19, and 7.26 × 10⁻⁶/K at room temperature. Temperature coefficients of refractive index for YAG, YVO₄ in ordinary and extraordinary polarization, and GdVO₄ in ordinary and extraordinary polarization at room temperature for the wavelength of 1.06 µm were 12.1, 15.5, 8.41, 15.2, and 9.92 × 10⁻⁶/K, respectively.

This work was ranked the fourth place in TOP-10 downloaded articles in June 2014 from OSA’s Optical Materials Express.

3. Improvement of Laser-Beam Distortion in Large-Aperture PPMgLN Device by Using X-Axis Czochralski-Grown Crystal

Large-aperture periodically poled Mg-doped LiNbO₃ device using X-axis Czochralski-grown MgLN crystal was proposed to avoid a laser-beam distortion problem, as shown in Figure 4. Availability of periodic poling in 5-mm-thick MgLN and compatibility of wavelength-conversion characteristics in QPM-OPO were evaluated by comparing with conventional arrangement using Z-axis-grown crystal.

![Figure 4. PPMgLN device fabricated from (a) Z-axis CZ-grown crystal, and (b) X-axis CZ-grown crystal.](image)

References

1) A. Kausas and T. Taira, The 61st JSAP spring meeting, 18p-PA3-3 (March 17–20, 2014).

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