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ERRATUM

Erratum to: Thermo-optic coefficients of Nd-doped anisotropic $KGd(WO_4)_2$, YVO_4 and $GdVO_4$ laser crystals

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In the original publication of the article, the reported values of the thermo-optic coefficients dn/dT for tetragonal vanadate laser crystals, Nd:YVO_4 and Nd:$GdVO_4$, are underestimated. The values of dn/dT were measured by a laser beam deviation method for a medium with a linear thermal gradient [2]. An error occurred during the measurements of the temperature gradient ΔT in the studied sample. Vanadates have a relatively large thermal conductivity (κ ~10 W/mK [3]). In addition, we used relatively small samples (height: ~4 mm). This resulted in an unexpected and strong heat flow through the sample leading to a reduction of the ΔT value.

To overcome this problem, we have modified the experimental set-up. To produce a linear thermal gradient in the sample, two massive copper blocks were used. They were attached to the two opposite lateral faces of the sample. A heat grease was used to provide the thermal contact. We drilled two small holes (~1 mm in diameter) in the sample/block interface (one hole for the "cold" block and second one for the "hot" block). Two sensitive calibrated thermocouples (Type K, chromel–alumel) were inserted into these holes which were subsequently filled with heat grease. The precision of the determination of the ΔT was ~1 K. All remaining features of the set-up and description of the experiment can be found in [1]. We have used the same samples from Nd:YVO_4 and Nd:$GdVO_4$ as in [1]. With the modified set-up, we carefully repeated the measurements of dn/dT. The temperature of the "cold" sample surface was ~273 K, and the temperature of the "hot" one was ~303 K.

In [1], due to the absence of reliable data on thermal expansion coefficients α which are needed for the derivation of dn/dT, we used values averaged over several publications. In the present erratum, we have used original data obtained by a high-precision dilatometry, $\alpha_a = 1.90$ and $\alpha_c = 8.34 \times 10^{-6}$ K^{-1} for Nd:YVO_4, $\alpha_a = 1.19$ and $\alpha_c = 8.10 \times 10^{-6}$ K^{-1} for Nd:$GdVO_4$ [4]. The precision was ~0.05×10^{-6} K^{-1}. These values are in good correlation with an independent study by Sato and Taira [5].

The results on thermal coefficients of the optical path (TCOP) and dn/dT coefficients for Nd: YVO_4 and Nd:$GdVO_4$ crystals at 633 nm are presented in Table 1. The error of their determination is ~0.5×10^{-6} K^{-1}, see [4] for details. For both vanadates, dn/dT coefficients are positive and follow the relation $dn_o/dT > dn_e/dT$. This is in agreement with the original publication [1]. However, their values are larger than ones reported in [1]. At 633 nm, $dn_o/dT = 18.3$ and $dn_e/dT = 12.3 \times 10^{-6}$ K^{-1} for Nd:YVO_4, $dn_o/dT = 19.1$ and $dn_e/dT = 13.8 \times 10^{-6}$ K^{-1} for Nd:$GdVO_4$.

These values are now in good agreement with dn/dT coefficients in YVO_4 and $GdVO_4$ reported by Zelmon et al. [6, 7] and determined by a conventional minimum deviation method, $dn_o/dT = 18.6$ and $dn_e/dT = 13.6 \times 10^{-6}$ K^{-1} for

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Nd:YVO_4, $dn_o/dT = 19.0$ and $dn_e/dT = 14.2 \times 10^{-6}$ K^{-1} for Nd:$GdVO_4$ at 600 nm.

The corrected version of Table 1 is given below.

Table 1 New thermal coefficients of the optical path (TCOP) and thermo-optic coefficients dn/dT for Nd:$GdVO_4$ and Nd:YVO_4 laser crystals at 633 nm

Polarization	Nd:$GdVO_4$		Nd:YVO_4
	$k \parallel c$	$k \perp c$	$k \perp c$
TCOP (10^{-6} K^{-1})			
$E \parallel c$	–	15.3	14.6
$E \perp c$	27.5	20.0	20.2
dn/dT (10^{-6} K^{-1})			
$E \parallel c$	–	13.8	12.3
$E \perp c$	19.3	18.8	18.3

k denotes light propagation direction (it is equivalent to the crystal cut), and E is light polarization

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