

## Nd:GdVO<sub>4</sub>晶体的生长与光谱性能

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**摘要** 采用Czochralski法生长了均匀透明的Nd:GdVO<sub>4</sub>晶体, 测量了其室温偏振吸收谱, 并与0.2mol·L<sup>-1</sup>的NdCl<sub>3</sub>溶液的室温吸收谱进行了比较。根据Judd-Ofelt理论, 拟合出晶体场唯象强度参数:  $\Omega_2=12.629 \times 10^{-20} \text{cm}^2$ ,  $\Omega_4=4.828 \times 10^{-20} \text{cm}^2$ ,  $\Omega_6=8.425 \times 10^{-20} \text{cm}^2$ 。计算了各能级的辐射跃迁几率AJ, J', 振子强度PJ, J', 辐射寿命 $\tau$ , 荧光分支比 $\beta J'$ 等光学参量。并用LD激光器泵浦Nd:GVO<sub>4</sub>晶体, 当量大泵浦功率为26W时, 得到输出功率为14.3W波长为1.06 $\mu\text{m}$ 的基频光, 光-光转换效率为55%, 斜效率为63%。

**关键词** [钕](#) [钒酸镱](#) [晶体生长](#) [光谱参数](#) [激光晶体](#)

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## Growth and spectroscopic properties of Nd: GdVO<sub>4</sub> crystal

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**Abstract** Transparent and homogeneous Nd:GdVO<sub>4</sub> crystal have been obtained by the Czochralski method. The room temperature absorption spectra has been measured and compared with that of 0.2mol·L<sup>-1</sup> NdCl<sub>3</sub> solution. The spectral strength parameters:  $\Omega_2=12.629 \times 10^{-20} \text{cm}^2$ ,  $\Omega_4=4.828 \times 10^{-20} \text{cm}^2$ ,  $\Omega_6=8.425 \times 10^{-20} \text{cm}^2$  of Nd<sup>3+</sup> ion were fitted according to the Judd-Ofelt theory. The radiative transition probabilities AJ, J', oscillator strengths PJ, J', radiative lifetime  $\tau$  and the branching ratio  $\beta J'$  were also calculated. A highest output power of up to 14.3 W at 1.06 $\mu\text{m}$  was observed with a 4 mm thick Nd: GdVO<sub>4</sub> crystal sample when pumped by a 26W cw laser diode array. The light-light conversion efficiency was 55%, with an average slope efficiency of 63%.

**Key words** [NEODYMIUM](#) [CRYSTAL GROWTH](#) [LASER CRYSTAL](#)

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扩展功能

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