Magnesium Doped Lithium Niobate MgO:$LiNbO_3$

Introduction

Compared with $LiNbO_3$ crystal, MgO:$LiNbO_3$ crystal exhibits its particular advantages for NCPM frequency doubling (SHG) of Nd:Lasers, mixing (SFG) and optical parametric oscillators (OPOs). The SHG efficiencies of over 65% for pulsed Nd:YAG lasers and 45% for cw Nd:YAG lasers have been achieved by MgO:$LiNbO_3$ crystals, respectively. MgO:$LiNbO_3$ is also a good crystal for optical parametric oscillators (OPOs) and amplifiers (OPAs), quasi-phase-matched doublers and integrated waveguide.

MgO:$LiNbO_3$ is characterized by

- High damage threshold
- Noncritical phase matching (NCPM) at room temperature
- Broad transparency range
- Excellent E-O and NLO properties
- Good mechanical and chemical properties

MgO:$LiNbO_3$ has similar effective nonlinear coefficient to pure $LiNbO_3$. Its Sellmeier equations (for 5mol% MgO dopant) are (λin μm):

$$n_o^2(\lambda)=4.8762+0.11554/(\lambda^2-0.04674)-0.033119\times\lambda^2$$
$$n_e^2(\lambda)=4.5469+0.094779/(\lambda^2-0.04439)-0.026721\times\lambda^2$$

Different dimensions of MgO:$LiNbO_3$ with high quality are available from CASTECH. The AR coating is available upon request.