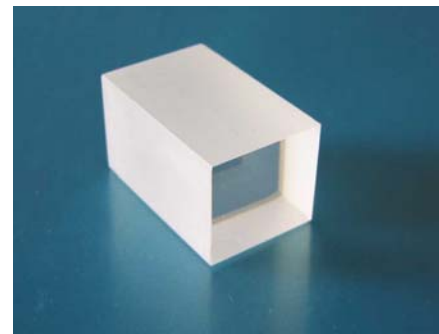


KDP & KD*P

Potassium Dihydrogen Phosphate (**KDP**) and Potassium Dideuterium Phosphate (**KD*P** or **DKDP**) Potassium Dihydrogen Phosphate (KDP) and Potassium Dideuterium Phosphate (KD*P) are among the most widely-used commercial NLO materials, characterized by good UV transmission, high damage threshold, and high birefringence, though their NLO coefficients are relatively low. They are usually used for doubling, tripling and quadrupling of a Nd:YAG laser at the room temperature. In addition, they are also excellent electro-optic crystals with high electro-optic coefficients, widely used as electro-optical modulators, such as Q-switches, Pockels Cells, etc.

AOTK supplies high quality KDP and KD*P crystals in large quantities for these applications. Because their polished surfaces are easier to be moistened, however, the user is advised to provide a dry condition (<50%) and the sealed housing for preservation. For this purpose, AOTK also provides polishing and sealed housing services for the KDP family crystals. Our engineers will serve you to select and design the best crystal, according to the laser parameters you provide.



Applications

- Second, third, and fourth harmonic generation of Nd:lasers
- Frequency doubling of dyer laser
- High power laser frequency conversion materials
- Shutter for high speed photography
- Electro-optical modulator and Q switches

Basic Properties

Structural and Physical Properties

	KDP	KD*P (DKDP)
Chemical Formula	KH_2PO_4	KD_2PO_4
Crystal Structure	Tetragonal	Tetragonal
Transmission Range	200-1500nm	200-1600nm
Nonlinear Coefficients	$d_{36}=0.44\text{pm/V}$	$d_{36}=0.40\text{pm/V}$
Refractive Indexes (at 1064nm)	$n_o = 1.4938$ $n_e = 1.4599$	$n_o = 1.4948$ $n_e = 1.4554$
Electro-Optical Coefficients	$r_{41}=8.8\text{pm/V}$ $r_{63}=10.3\text{pm/V}$	$r_{41}=8.8\text{pm/V}$ $r_{63}=25\text{pm/V}$
Longitudinal Half-Wave Voltage	$V_p=7.65\text{KV} (\lambda=546\text{nm})$	$V_p=2.98\text{KV} (\lambda=546\text{nm})$
Absorption	0.07/cm	0.006/cm
Temperature Synchronism Width	11.5 °C*cm	7.4 °C*cm
Spectral Synchronism Width	106 Å*cm	32 Å*cm
Angle Synchronism Width	0.84 mrad*cm	0.94 mrad*cm
Absorption Coefficient, cm^{-1}	0.07	0.006

Sellmeier Equations

KDP	$n_o^2 = 2.259276 + 0.01008956/(\lambda^2 - 0.012942625) + 13.005522\lambda^2/(\lambda^2 - 400)$ $n_e^2 = 2.132668 + 0.008637494/(\lambda^2 - 0.012281043) + 3.2279924\lambda^2/(\lambda^2 - 400)$
KD*P	$n_o^2 = 1.9575544 + 0.2901391/(\lambda^2 - 0.0281399) - 0.02824391\lambda^2 + 0.004977826\lambda^4$ $n_e^2 = 1.5005779 + 0.6276034/(\lambda^2 - 0.0131558) - 0.01054063\lambda^2 + 0.002243821\lambda^4$

Specifications

Dimensional Tolerance	$(W \pm 0.1\text{mm}) \times (H \pm 0.1\text{mm}) \times (L +0.2/-0.1 \text{ mm})$
Angle Tolerance	$\Delta\theta < \pm 0.2^\circ, \Delta\phi < \pm 0.2^\circ$
Flatness	$\lambda/8 @633 \text{ nm}$
Surface Quality	10/5 Scratch/Dig per MIL-O-13830A
Parallelism	< 20 arc seconds
Perpendicularity	< 5 arc minutes
Clear Aperture	> 90% central area
Quality Warranty Period	one year under proper use
Dimensional Tolerance	$(W \pm 0.1\text{mm}) \times (H \pm 0.1\text{mm}) \times (L +0.2/-0.1 \text{ mm})$

Note

- KDP and KD*P is highly hygroscopic and the coating can Not be available.
Please keep it in a dry environment, and sealed housing is recommended.
- The LiIO₃ crystals is available too.

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