

# KDP AND DKDP CRYSTALS

Lasers  
Laser Components  
Laser Optics

KDP and DKDP are nonlinear and electrooptic crystals wide using for harmonics generation in visible and UV spectral range and for Q-switching solid state lasers (Nd: YAG, rubin,  $Al_2O_3:Ti^{3+}$  etc.).

## BASIC AND OPTICAL PROPERTIES

Crystal	KDP	DKDP
Chemical Formula	$KH_2PO_4$	$KD_2PO_4$
Point symmetry	42 m	42 m
Hydroscopicity	high	high
Density, g/cm <sup>3</sup>	2.332	2.355
Transmission range, mm	0.18–1.5	0.2–2.0
Absorption coefficient (1064 nm), cm <sup>-1</sup>	0.03	0.006
Refractive index (at 1064 nm)	$n_o=1.4938; n_e=1.4599$	$n_o=1.4931; n_e=1.4582$
Curi temperature, K	122	222
Melting temperature, K	523–525	—
Electro-optic coefficient (static 293 K) $r_{63}$ , pm/V	10.5	25.7
Damage threshold (at 1064 nm), GW/cm <sup>2</sup>	14.4 (15 ns)	0.5 (10 ns)

## NON-LINEAR PROPERTIES

PHASE MATCHING (PM) ANGLES FOR SHG OF 1064 NM

Crystal	Type of PM	Angle of PM $\theta$ , °	Acceptances (FWHM)			Walk off, mrad
			Spectral $\Delta\lambda$ , nm·cm	$\Delta\theta$ , mrad·cm	$\Delta T$ , K·cm	
KDP	ooe	41	7.25	2.73	11	27
	oeo	59	5.57	5.29	13.2	24
DKDP	ooe	37	—	1.8	19.2	—
	oeo	53.5	5.57	3.0	6.7	24

PM ANGLES FOR FHG OF 1064 NM (532 NM — 266 NM)

Crystal	Type of PM	$\theta$ , °	$\Delta\lambda$ , nm·cm	$\Delta\theta$ , mrad·cm	$\Delta T$ , K·cm
KDP	ooe	77	0.13	1.5	1.2
DKDP	ooe	90 (at T=52°C)	—	13.4	1.77

PM ANGLES FOR THG OF 1064 NM (1064 NM — 355 NM)

Crystal	Type of PM	Angle of PM $\theta$ , °
KDP	oeo	58
DKDP	oeo	59

## ELECTRO-OPTIC PROPERTIES

Crystal	Half-wave voltage ( $\lambda=1064$ nm, 293 K), kV
KDP	15
DKDP	6.6 (D ~ 95%) – 8 (D ~ 85%)

LOTIS TII supplies high quality KDP and DKDP crystals with square apertures and standard sizes from  $10 \times 10 \times 20$  mm<sup>3</sup> to  $15 \times 15 \times 30$  mm<sup>3</sup>. Large size crystals are available on request. Crystals can be supplied with or without AR coating. DKDP for Q-switch are delivered with electrodes.