KDP - Potassium Dihydrogen Phosphate and DKDP or KD*P - Potassium Dideuterium Phosphate

Introduction

Potassium Dihydrogen Phosphate (KDP) and Potassium Dideuterium Phosphate (DKDP) 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 under 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.

CASTECH's KDP & DKDP products

CASTECH supplies high quality KDP and DKDP crystals in large quantities for these applications. Because their polished surfaces are easier to be moistened, the user is advised to provide the dry condition (＜50%) and the sealed housing for preservation. For this purpose, CASTECH also provides polishing, coating 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.

Table 1. Basic Properties

	DKDP	KDP
Chemical Formula	KD_2PO_4	KH_2PO_4
Transparency Range	200-2100 nm (98% deuterium content)	200-1650 nm
Nonlinear Coefficients	$d_{36} = 0.40$ pm/V	$d_{36} = 0.44$ pm/V
Refractive Index (at 1064 nm)	$n_o = 1.4948$, $n_e = 1.4554$	$n_o = 1.4938$, $n_e = 1.4599$
Electro-optic Coefficients	$r_{41} = 8.8$ pm/V $r_{63} = 25$ pm/V	$r_{41} = 8.8$ pm/V $r_{63} = 10.3$ pm/V
Longitudinal Half-wave Voltage	$V_\pi = 2.98$ KV ($\lambda = 546$ nm)	$V_\pi = 7.65$ KV ($\lambda = 546$ nm)
Absorption Coefficients	0.006 /cm	0.07 /cm
Damage Threshold	>3 GW/cm^2	>5 GW/cm^2
Extinction Ratio	30 dB	
Sellmeier Equations of DKDP: (λ in μm)		
$n_o^2 = 1.9575544 + 0.2901391\,\lambda^2 / (\lambda^2 - 0.0281399) - 0.02824391\,\lambda^2 + 0.004977826\,\lambda^4$ $n_e^2 = 1.5057799 + 0.6276034\,\lambda^2 / (\lambda^2 - 0.0131558) - 0.01054063\,\lambda^2 + 0.002243821\,\lambda^4$		
Sellmeier Equations of KDP: (λ in μm)		
$n_o^2 = 2.259276 + 0.01008956 / (\lambda^2 - 0.012942625) + 13.00522\,\lambda^2 / (\lambda^2 - 400)$ $n_e^2 = 2.132668 + 0.008637494 / (\lambda^2 - 0.012281043) + 3.2279924\,\lambda^2 / (\lambda^2 - 400)$		

Coatings

AR-Coatings are available with high quality upon request.