

# RTP Crystal

## Introduction

RTP (Rubidium Titanyl Phosphate –  $\text{RbTiOPO}_4$ ) is an isomorph of KTP crystal which is used in nonlinear and Electro-Optical applications. It has advantages of high damage threshold (about 1.8 times of KTP), high resistivity, high repetition rate, no hygroscopic and no induced piezo-electric effect with electrical signals up to 60 kHz. Its transmission range is 350nm to 4500nm.

### Basic Properties

Crystal Structure	Orthorhombic
Cell Parameters	$a = 12.96 \text{ \AA}; b = 10.56 \text{ \AA}; c = 6.49 \text{ \AA}$
Mohs Hardness	About 5
Density ( $\text{g/cm}^3$ )	3.6
Melting Point:	About $1000^\circ\text{C}$
Thermal Expansion Coefficients (/K)	$\alpha_x = 1.01 \times 10^{-5}, \alpha_y = 1.37 \times 10^{-5}$ $\alpha_z = -4.17 \times 10^{-6}$
Sellmeier Equations ( $\lambda$ in $\mu\text{m}$ )	$n_x^2 = 2.15559 + 0.93307[1 - (0.20994/\lambda)^2] - 0.01452\lambda^2$ $n_y^2 = 2.38494 + 0.73603[1 - (0.23891/\lambda)^2] - 0.01583\lambda^2$ $n_z^2 = 2.27723 + 1.11030[1 - (0.23454/\lambda)^2] - 0.01995\lambda^2$
Thermo-optical Coefficients( $d\lambda/dT$ )	$-0.029 \text{ nm}/^\circ\text{C}$
Electro-optic Constants(Y-cut) (X-cut)	$r_{33} = 38.5 \text{ pm/V}$ $r_{33} = 35 \text{ pm/V}, r_{23} = 12.5 \text{ pm/V}, r_{13} = 10.6 \text{ pm/V}$
Electrical Resistivity	About $10^{11} - 10^{12} \text{ ohm}\cdot\text{cm}$
Static Half Wave Voltage at 1064 nm	4x4x20 mm: 1,600 V 6x6x20 mm: 2,400 V 9x9x20 mm: 3,600 V
Extinction Ratio	$>20\text{dB}@633\text{nm}$

### Specifications

Growing Orientation	Along Y-axis
Maximum Length(5x5mm <sup>2</sup> aperture)	25mm
Length Tolerance(mm)	+0.5 / -0.1
Width and Height Tolerance (mm)	$\pm 0.1$
Parallelism	$< 30''$
Perpendicularity	$< 15'$
Surface Quality	20/10
Coating	AR-coatings