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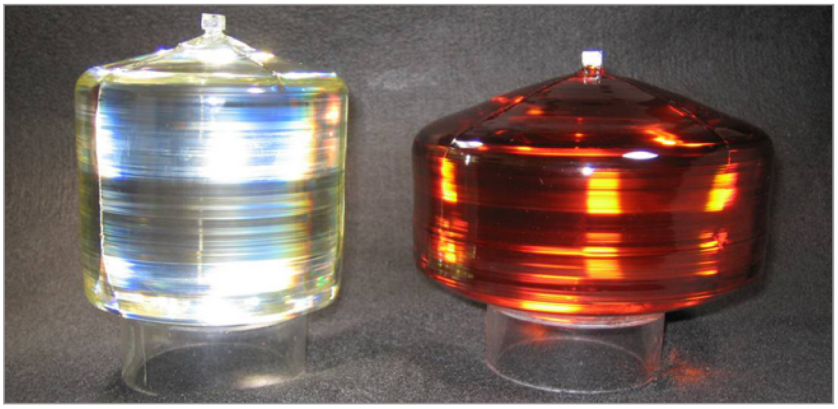
Lithium Tantalate Properties



Fundamental Properties

Item		
Melting Point		1650° C
Crystal System		Trigonal
Point Group		3m
Crystal Density		7.465 x 10^3 kg / m^3
Curie Temperature (Tc)		603.5 ± 5.5°C
Heat Capacity (Cp)		100 J / k.mol
Dielectric Constants	($^T_{11}$)	53.6
	($^T_{33}$)	43.4
Elastic Constants	(c^E_{11})	2.331 x 10^{11} N / m^2
	(c^E_{12})	0.464
	(c^E_{13})	0.852
	(c^E_{14})	-0.161
	(c^E_{33})	2.761
	(c^E_{44})	1.029
Piezoelectric Strain Constants	(e_{15})	2.63 C / m^2
	(e_{22})	1.84
	(e_{31})	-0.11
	(e_{33})	1.93

Typical Acoustic Properties

Surface Acoustic Wave Properties

Description	Propagation	Design	Surface Wave Velocity (m/s)	Coupling Coefficient k² (%)	Group Delay Time Temp Coefficient (ppm/Â°C)	Propagation Loss of SAW (dB/cm)
36 ° Y -	X - Axis	SSBW	4160	5.0	28 ~ 32	-

Description	Propagation	Design	Surface Wave Velocity (m/s)	Coupling Coefficient k² (%)	Group Delay Time Temp Coefficient (ppm/Â°C)	Propagation Loss of SAW (dB/cm)
Cut						
42° Y - Cut	X - Axis	SSBW	4022	7.6	40	-
X - Cut	112.2 Y Direction	SAW	3290	0.75	18	-
SAW = Surface Acoustic Wave L, SAW =Leaky SAW						

Selective Piezoelectric Coupling Factors & Frequency Constants

Plate Orientation	Wave Type	Coupling Factor	Resonance Frequency Constant (MHz-mm)
X	S	0.44	1.906
Z	E	0.19	3.040
36° Y - Cut	QE	-	-
163° Y - Cut	QS	-	-
E = extensional S = shear QE = quasi - extensional QS = quasi - shear			

Typical Optical Properties

Electro-Optic Coefficients $r(10^{-12}\ mV^{-1})$ at 632.8 nm

${}_rT_{13}$	8.4	${}_rS_{13}$	7
${}_rT_{22}$	-	${}_rS_{22}$	1
${}_rT_{33}$	30.5	${}_rS_{33}$	30.3
${}_rT_{51}$	-	${}_rS_{51}$	20

Nonlinear Optical Coefficients at 1-06 μ m ($*d_{31}=d_{15}$)

$d_{22} / \| d_{36}^{KDP} \|$	4.4
$d_{31} / \| d_{36}^{KDP} \|$	-2.7
$d_{33} / \| d_{36}^{KDP} \|$	-4.1

Refractive Index at 632.8 nm

n_o	2.1787
n_e	2.1821
n_o: TE mode n_e: TM mode	