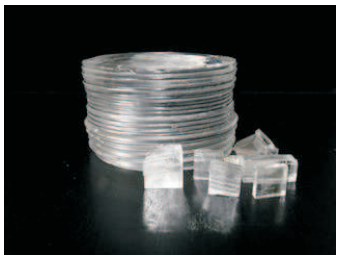
KBr (Potassium Bromide)



Potassium bromide (KBr) is one of the most popular materials used in spectroscopy due to the wide transmission range. It corresponds to salt crystals as well as KCl and NaCl. KBr is a monocrystal, soft and stable to thermal influence however should be avoided from a contact with water and spirit solutions, glycerin, and acids. Due to material hygroscopicity the polished parts require storage in desiccator or in sealed package with silica gel in a warm

Application

- IR/FTIR spectroscopy

Product types

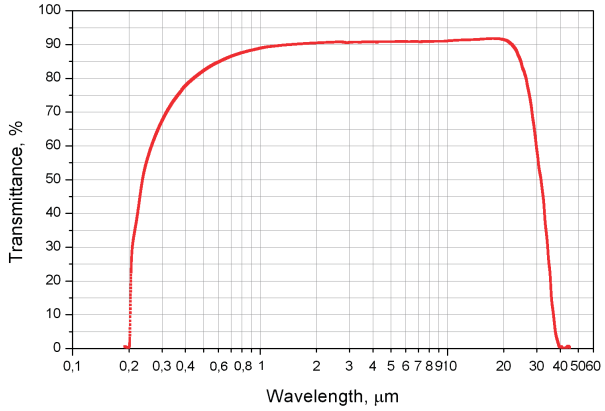
- Plane-parallel windows and wedges
- Beamsplitter substrates for FTIR spectroscopy
- Lenses

Specifications

Tab.1. Typical specification of KBr optical components

Specification	Typical	State-of-the-art
Sizes	See table in the article *Plane Windows and Wedged Windows*	RFQ (up to 100mm size)
Diameter tolerance, mm	+0/-0.25	RFQ
Thickness tolerance, mm	+/-0.25	RFQ
Thickness matching, mm	-	RFQ
Surface quality, scr/dig	60/40	RFQ
Surface flatness, λ @ 633 nm per inch*	2	RFQ
Parallelism (wedge tolerance)	5 arc min	RFQ
Coating	none	RFQ
Packaging	Typak®	

Transmission Spectrum



For the optics we use KBr material with absorption less than 0.5% in absorption bands (through reference 3mm thickness).

Tab.2. Refractive index

λ, μm	n
0.391	1.594
0.405	1.590
0.486	1.572
0.589	1.560
0.811	1.547
1.701	1.539
8.662	1.529
11.862	1.522
17.400	1.504
18.160	1.501
21.180	1.487
21.830	1.483
23.860	1.471
25.140	1.463

Tab.3. Optical properties

Transmission range, microns		0.22 – 28 μm
Color		colorless
Reflection losses (2 surfaces), %	5μm	8.8
	11μm	8.3
Absorption coefficient, cm^{-1}	10.6μm	≤ 0.001
	19μm	≤ 0.05
	26μm	≤ 0.33
	30μm	≤ 0.7
Restrahlen peak, μm		77.6
dN/dT, 10^{-6}/C		- 40.83
dN/dμ = 0, μm		4.2
Birefringence, nm/cm		<30

Tab.4. Physical and mechanical properties

Class/Structure		Cubic FCC, NaCl type, Fm3m, (100) cleavage
Density @300K, g/cm^2		2.753
Molecular Weight		119.01
Lattice constant, Å		6.60
Melting Point, C		730
Thermal Conductivity @319K, W/(m x K)		4.816
Thermal Expansion @300K, 10^{-6}/C		43
Hardness, Knoop with 200g indenter	in (100)	7
	in (110)	5.9
Specific Heat Capacity, J/(kg x K)		435
Debye temperature, K		174
Dielectric Constant for 10^2 - 10^{10} Hz	@ 295K	4.90
	@ 360K	4.97
Bandgap, eV		7.6
Young Modulus (E), GPa		64.79
Shear Modulus (G), GPa		5.08
Bulk Modulus (K), GPa		15.02
Elastic Coefficient		C11 = 34.5 C12 = 5.4 C44 = 5.08
Apparent Elastic Limit, MPa		1.1 (160psi)
Poisson Ratio		0.203

TYDEX® J.S.Co.
Домостроительная ул. 16, 194292 С.-Петербург, РОССИЯ
Тел: 7-812-3318701, -3346701; Факс: 7-812-3092958
E-mail: optics@tydex.ru, URL: http://www.tydex.ru

Tab.5. Chemical stability / Solubility

in water (at 0 °C)	53.48 g/100cm^3, hygroscopic
in acids	soluble
in organic solvents	
glycerin	soluble
lower spirits	soluble
ether	insignificantly soluble

Please pay your attention that this article is for your information only. We do not supply KBr in ingots as well as semi-finished products. Our standard products are polished parts.

For further information on our KBr optical components please see the following: Windows for IR-spectroscopy, FTIR beamsplitter substrates, Packaging or fill in our request form.

TYDEX® J.S.Co.
Домостроительная ул. 16, 194292 С.-Петербург, РОССИЯ
Тел: 7-812-3318701, -3346701; Факс: 7-812-3092958
E-mail: optics@tydex.ru, URL: http://www.tydex.ru