NaCl Sodium Chloride

Summary Description

NaCl is a low cost alternative to KBr for infrared sampling. Its refractive index is very similar to KBr thereby providing good IR transmissivity. However its long wavelength cutoff is higher than KBr so depending upon crystal thickness it may limit spectral range coverage. NaCl is harder and less hygroscopic than KBr but can only be used with anhydrous solvents, glycerol or alcohols. It withstands thermal and mechanical shock fairly well. A protective coating can improve its resistance to humidity. NaCl should be stored in a desiccator or heated cabinet.

Advantages

1. Low cost
2. Very small impurity bands
3. Performs better than KBr with acid salts

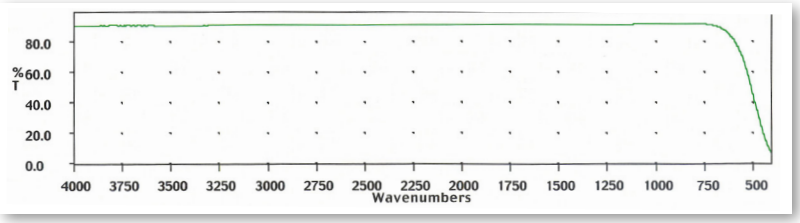
Disadvantages

1. Very soluble in water – fogs easily in humid environments
2. Easily confused with KBr

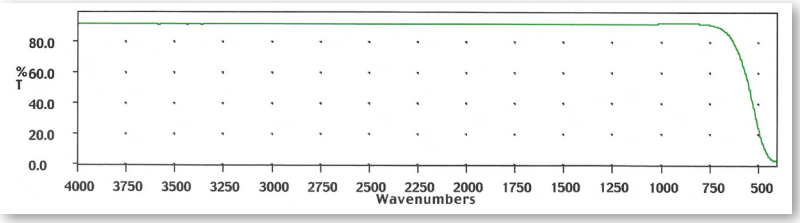
Physical Data

Melting Point:	414.5 °C
Density:	5.65 g/cm^3
Solubility in H_2O:	0.05 g/100 g at 20 °C
Hardness:	40 kg/mm^2
Appearance:	Clear crystalline

Mid-IR Transmission – 2 mm thick NaCl window



Mid-IR Transmission – 4 mm thick NaCl window



Refractive Index[1]

WAVELENGTH (Microns)	INDEX	WAVELENGTH (Microns)	INDEX
0.589	1.54427	8.04	1.5064
0.64	1.54141	9.000	1.501
0.7604	1.53682	10.0184	1.49462
0.7858	1.53607	12.5	1.47568
1.1786	1.53031	13.5	1.4666
1.767	1.52736	14.733	1.45427
2.356	1.52579	15.9116	1.4409
4.123	1.52156	17.93	1.4149
6.4825	1.51347	22.3	1.3403

Specific index listed; Generic: 1.49 @ 10 microns

Spectral Range

Short Wavelength Limit: 52,600 cm^{-1} (1 mm)
Long Wavelength Limit: 457 cm^{-1} (2 mm), 584 cm^{-1} (4 mm)

Coatings

NaCl can be protectively coated against moisture.

TYPICAL USES

- **Room temperature IR detector windows**
- **Liquid cell windows for non-polar liquids**

Notes

Short and Long Wavelength Ranges defined for which transmissivity is greater than 50% of stated crystal thickness.

1. W.W. Coblentz; Journal of the Optical Society of Americas. Vol. 4, p.433, 1920.

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