



Thermo offers a selection of products to help with the storage and preparation of FT-IR samples. In addition, we offer a wide variety of ATR crystal materials and transmission window materials to facilitate your analyses.

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Economical holders for mounting KBr pellets and recording data

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## Spectra-Tech Econo-Cards

Spectra-Tech Econo-Cards are economical holders with self-adhesive apertures for mounting KBr pellets, discs, and films. Each 2" x 3" card is preprinted for recording data and installs in the slide mount of all infrared spectrometers.

### Applications

- Handling of pellets, discs, and films
- Sample archival
- Recording data

### Features

- Available for two differently sized pellets – 10 mm and 13 mm
- Holds standard size pellets for analysis
- Good for future reference (e.g. maintaining a library)



### Product Configuration

Product Configuration	Part Number
Spectra-Tech Econo-Cards 10 mm, 100	0026-017
Spectra-Tech Econo-Cards 13 mm, 100	0026-018

Convenient means to hold transmission films

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## Spectra-Tech Film Sample Cards

Spectra-Tech Film Sample Cards provide an economical and convenient means to hold transmission films for analysis by infrared spectroscopy. The self-adhesive card holds together to secure a transmission film. Each card has a preprinted area for noting the sample number, date of analysis, material, and additional comments.

### Applications

- Storage of films
- Transmission analysis of films
- Recording data

### Features

- 16 mm aperture
- Good for future reference (e.g. maintaining a library)
- Designed to fit in standard slide mount



### Product Configuration

Product Configuration	Part Number
Spectra-Tech Film Sample Cards, 100	0026-021

## Infrared Diluent Materials

Various IR diluents in powder and chunk form are available for use in pellet making and for diffuse reflectance and transmission spectroscopy. The powders, available in KBr, High Density Polyethylene (HDPE), CsI, KCl, and diamond, are spectral quality and are ready to mix with the sample. Diamond powder is useful when the sample contains water that would mix with KBr or KCl. The chunks, available in KBr and KCl, are economically sized pieces of dispersing matrix material for grinding to the desired particle size and then mixing with the sample. A selection of matrix materials is offered to accommodate specific sampling needs.



Variety of IR diluents in powder or chunk form for use in pellet making

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### Applications

- Diffuse reflectance analysis
- Transmission analysis
- Pellets

Powders	Part Number
KBr powder, 100 g	0016-015
HDPE powder, 100 g (Far-IR)	0016-018
CsI powder, 50 g (Far-IR)	0016-020
KCl powder, 100 g	0016-021
Diamond powder, 25 carat, 5 g	0016-024

KBr Powder Packets, 0.5 g premeasured per packet	Part Number
Spectra-Tech KBr Powder Packets, 25	0016-030
Spectra-Tech KBr Powder Packets, 100	0016-031
Spectra-Tech KBr Powder Packets, 250	0016-032
Spectra-Tech KBr Powder Packets, 500	0016-033

Chunks	Part Number
KBr chunks, 100 g	0016-022
KCl chunks, 100 g	0016-023

## Mull Technique Supplies

Tools and matrix materials are available to assist with preparing mulls for transmission analysis. Samples are ground and mixed with a viscous mulling agent, such as Nujol, and spread onto windows for analysis. The grinding or mixing is accomplished in either an agate mortar and pestle or a motorized grinder/mixer like the Spectra-Tech WIG-L-BUG (see page 48 for details).



Tools and matrix materials for preparing mulls for transmission analysis

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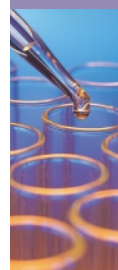
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### Applications

- Organics
- Pharmaceuticals
- Solids

Product Configuration	Part Number
Nujol, 4 oz.	0026-110
Fluorolube, 1 oz.	0026-111
Agate mortar and pestle, 35 mm O.D.	0026-105
Agate mortar and pestle, 65 mm O.D.	0026-106
Agate mortar and pestle, 95 mm O.D.	0026-107
Spatula, 8 inch	861-0003



The basics  
for general  
sample  
preparation

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## Miscellaneous Laboratory Supplies

In addition to specific supplies used for preparing mulls, smears, and pellets, some basic supplies and tools used in general laboratory sample preparation and analysis are available.

Product Configuration	Part Number
Glass syringe, 1 cc	862-0001
Glass syringe, 3 cc	862-0003
Glass syringe, 10 cc	862-0010
Curved dressing forceps	861-0001
Splinter forceps	861-0002
Teflon-coated forceps	861-0004
Safety glasses (impact resistant)	861-0005

Everything  
needed to  
keep salt  
windows in  
good condition

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## Crystal Polishing Kit

For laboratories that use salt (NaCl, KBr, and KCl) windows extensively, the Crystal Polishing Kit is the perfect way to keep them in good condition. The kit contains all the materials necessary for grinding, polishing, and buffing.



### Applications

- Hand polishing and reconditioning of salt (NaCl, KBr, and KCl) windows

### Features

- Everything necessary included in one kit
- Three different polishing compounds included
- Recommended for routine use
- Cost effective

Product Configuration	Part Number
Crystal Polishing Kit Includes: custom hardwood base, 2 ground glass pads, 1 spring holder assembly (consists of 2 hex bars and 2 springs), 1 felt sheet, 1 bottle of liquid polishing compound, 1 box each 400 grit coarse and 600 grit fine abrasive powder, 3 camel hair brushes and a polishing instruction booklet.	0022-001

Options/Replacements	Part Number
400 grit coarse abrasive powder, 1 box	2000-445
600 grit fine abrasive powder, 1 box	2000-446
Liquid polishing compound, 1 bottle	2000-501
Ground glass pad, 1 each	2000-442
Felt sheet, 1 each	2000-443
Hex bar, 1 each	2000-441
Spring, 1 each	840-0000
Camel hair brush	861-0000

## IR Material Selection Guide

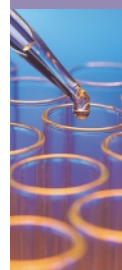
Use this guide to help determine the best IR materials for certain applications. The guide provides information on several materials' transmission range, water solubility, and refractive index. Also included are recommended cleaning agents, solvents to avoid, reactivity with the sample, mechanical, and thermal characteristics.

If a material is hygroscopic (absorbs moisture from the air), it is so noted in the Remarks column. Hygroscopic materials are used most frequently with organic compounds. Nonhygroscopic materials are typically used for samples containing water. Materials with a higher refractive index (such as KRS-5, Ge, ZnS, and ZnSe) are usually used as internal reflection elements in ATR accessories.

Material	Transmission Range (cm <sup>-1</sup> )	Useful Range for ATR (cm <sup>-1</sup> )	Refractive Index @1000 cm <sup>-1</sup>	%Trans. (window thickness)	Remarks
NaCl	40000 – 625	N/A	1.49	91.5 (4 mm)	hygroscopic, withstands thermal & mechanical shock
KBr	40000 – 400	N/A	1.52	90.5 (4 mm)	hygroscopic, withstands thermal & mechanical shock
CsI	40000 – 200	N/A	1.74	92 (2 mm)	hygroscopic, easily scratched, soft
CaF <sub>2</sub>	50000 – 1111	N/A	1.39	90 (4 mm)	withstands high pressure, resists most acids & bases
BaF <sub>2</sub>	50000 – 740	N/A	1.42	90 (3 mm)	subject to thermal & mechanical shock
AgCl	25000 – 360	N/A	1.98	84 (3 mm)	cold flows, attacks base metals, sensitive to UV
ZnS	17000 – 720	17000 – 950	2.2	70 (1 mm)	good ATR material, withstands shock
Sapphire	50000 – 1600	50000 – 1780	1.74	70 (2 mm)	hard, inert
AMTIR	11000 – 625	11000 – 840	2.5	68 (2 mm)	relatively hard, brittle, good ATR material
Ge	5500 – 475	5500 – 675	4.0	50 (2 mm)	hard & brittle, good ATR material, temp. sensitive
ZnSe	20000 – 454	20000 – 650	2.4	65 (1 mm)	hard & brittle, good ATR material
Si	8300 – 660 & 360 – 70	8300 – 1500 & 360 – 120	3.4	55 (2.5 mm)	hard & brittle, withstands thermal shock, inert
CdTe	20000 – 360	N/A	2.67	40 (5 mm)	very brittle, easily cracked
Diamond	4500 – 2500 & 1667 – 33	4200 – 200	2.4	70 (1 mm)	very hard, withstands high pressure, chemically inert
KRS-5	20000 – 250	20000 – 400	2.37	70 (2 mm)	deforms under pressure, conventional ATR material
Quartz	25000 – 2200	N/A	1.4	90 (3mm)	hard, inert

Material	Water Sol. (g/100g H <sub>2</sub> O) @25°C	Max. useful temp. in air (°C)	Density g/cm <sup>3</sup>	Cleaning Agents	Solvents which attack material	Hardness (Knoop#)
NaCl	35.7	400	2.17	anhydrous solvents	lower alcohols "wet" solvents	15
KBr	53.5	300	2.75	anhydrous solvents	lower alcohols "wet" solvents	7
CsI	44.4	200	4.50	anhydrous solvents	lower alcohols "wet" solvents	20
CaF <sub>2</sub>	0.0013	900	3.18	acetone, alcohol	NH <sub>4</sub> <sup>+</sup> salts, acids	158
BaF <sub>2</sub>	0.17	500	4.83	acetone, alcohol	NH <sub>4</sub> <sup>+</sup> salts, acids	82
AgCl	0.00015	200	6.47	acetone, CH <sub>2</sub> Cl <sub>2</sub>	complexing agents*	9.5
ZnS	0.00069	300	4.08	acetone, alcohol	acids	178
Sapphire	insol.	1700	4.00	alcohol, acetone, H <sub>2</sub> O	acids, alkalies	1370
AMTIR	insol.	300	4.40	alcohol, acetone, H <sub>2</sub> O	alkalies	170
Ge	insol.	270	5.32	alcohol, acetone, H <sub>2</sub> O	H <sub>2</sub> SO <sub>4</sub> , aqua regia	550
ZnSe	insol.	300	5.27	alcohol, acetone, H <sub>2</sub> O	acids, strong alkalies	137
Si	insol.	300	2.33	alcohol, acetone, H <sub>2</sub> O	HF, HNO <sub>3</sub>	1150
CdTe	insol.	300	6.2	alcohol, acetone	acids, HNO <sub>3</sub>	56
Diamond	insol.	750	3.51	alcohol, acetone	K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> , conc. H <sub>2</sub> SO <sub>4</sub>	7000
KRS-5	0.05	200	7.37	MEK	complexing agents*	40
Quartz	insol.	1200	2.203	alcohol, acetone, H <sub>2</sub> O	HF, some hot acids and bases	820

\* Typical complexing agents include ammonium salts & materials such as EDTA.



High-quality crystals and windows ensure excellent results

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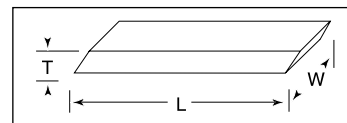
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## ATR Crystals and Transmission Windows

A full line of ATR crystals and transmission windows in many shapes, sizes, and materials is available. The windows fit in all standard Thermo cells as well as those from other manufacturers. Crystals fit in Spectra-Tech ATR accessories. Each crystal or window is cut, drilled, and polished to exacting tolerances.

Rigid quality controls at each step of fabrication ensure uniformity and excellence. Every window or crystal is individually sealed in an envelope, packed in foam and packaged in a plastic or metal container. Hygroscopic materials are packed with desiccant.



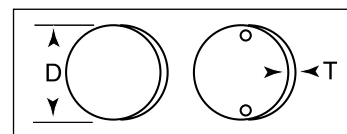
### ATR Crystals – Parallelogram

Part Number: 7002-###

Size L x W x T (mm)	KRS-5 ###		Ge ###			ZnSe ###		Si ###		
	45°	60°	30°	45°	60°	45°	60°	30°	45°	60°
25 x 10 x 3	182	183	184	185	186	188	189	190	191	192
25 x 20 x 3	122	123	124	125	126	128	129	130	131	132
50 x 10 x 3	032	033	034	035	036	038	039	040	041	042
50 x 20 x 3	077	078	079	080	081	083	084	085	086	087

### Transmission Windows – Disc

Part Number: 7000-###



Size D x T (mm)	NaCl ###	KBr ###	CaF <sub>2</sub> ###	BaF <sub>2</sub> ###	ZnS* ###	KRS-5 ###	CsI ###	AgCl ###	AgBr ###	Ge ###	Quartz ###	ZnSe* ###	CdTe* ###	Si ###
9 x 5	586	587	588	589	591*	592	N/A	594	595	596	597**	598*	599*	600
13 x 2	301	302	303	304	306	307	308	309	310	311	N/A	313	314	315
20 x 2	361	362	363	364	366	367	368	369	370	371	N/A	373	374	375
25 x 4	316	317	318	319	321*	322	323*	324	325	326	327	328*	329*	330
32 x 3	451	452	453	454	456*	457	458	459	460	461	462	463*	464*	465
32 x 3dr	466	467	468	469	471*	472	473	474	475	476	477	478*	479*	480
41 x 3	406	407	408	409	411*	412	413	414	415	416	N/A	418*	419*	420
49 x 6	421	422	423	424	426*	427	428	429	430	431	N/A	433*	434*	435
50 x 3	436	437	438	439	441*	442	443	444	445	446	N/A	448*	449*	450

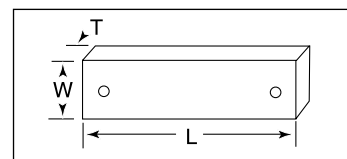
dr = drilled

\* = ZnS, ZnSe, CdTe and other windows as noted are 2 mm thick. Standard tolerances: diameter: +0.0 mm, -0.5 mm; thickness: +0.5 mm, -0.0 mm. Other materials and dimensions are available upon request.

\*\* = a standard window thickness of 3 mm.

### Transmission Windows – Rectangle

Part Number: 7000-###



Size L x W x T (mm)	NaCl ###	KBr ###	CaF <sub>2</sub> ###	BaF <sub>2</sub> ###	ZnS* ###	KRS-5 ###	CsI ###	AgCl ###	AgBr ###	Ge ###	Quartz ###	ZnSe* ###	CdTe* ###	Si ###
29 x 14 x 4	271	272	273	274	276*	277	278	279	282	281	N/A	283*	284*	285
29 x 14 x 4dr	286	287	288	289	291*	292	N/A	N/A	N/A	296	N/A	298*	299*	300
41 x 23 x 6	241	242	243	244	246*	247	248	249	250	251	N/A	253*	254*	255
41 x 23 x 6dr	256	257	258	259	261*	262	263	264	265	266	N/A	268*	269*	270
50 x 25 x 6	136	137	138	139	141*	142	143	144	145	146	N/A	148*	149*	150
50 x 25 x 6dr	151	152	153	154	156*	157	158	159	160	161	N/A	163*	164*	165

dr = drilled

\* = ZnS, ZnSe, CdTe and windows are 2 mm thick. Standard tolerances: Length and width: -0.0 mm, -0.05 mm. Thickness: +0.5 mm, -0.0 mm. Other materials and dimensions are available upon request.