



UM OPTICS

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About UM OPTICS



UM OPTICS is a comprehensive optical materials and components manufacturing company and a national high-tech enterprise. The company's business scope includes material growth, component processing, coating, devices and other full industry chain closed loops. UM OPTICS has more than 400 employees, including more than 20 doctoral degree holders, and the proportion of scientific research personnel is over 20%. It is an optical design, production research and development, and technical expert team.

The materials produced by UM OPTICS include infrared materials such as CaF_2 , BaF_2 , MgF_2 , LiF , Si , Ge , ZnS , and ZnSe . At the same time, we have world-leading growth processes for CaF_2 , BaF_2 , MgF_2 , and LiF . UM OPTICS is China's largest capacity fluoride supplier, with an annual output of more than 100 tons of fluoride. At the same time, we are also a leading supplier of silicon and germanium materials in China, with an annual output of

more than 30 tons. UM OPTICS currently has flat, spherical, and non-spherical processing centers, with an annual production of more than 8 million optical lenses such as flat plates, lenses, prisms, and non-spherical lenses. UM OPTICS provides infrared crystal materials to customers in more than 60 countries and regions worldwide, and provides customized infrared crystal materials with low stress, high purity, and high uniformity.

UM OPTICS is committed to providing high-quality products and services, and becoming one of the world's leading optical materials and components manufacturing companies.



Ability Introduction

Crystal growth capability

We are a leading domestic enterprise in the growth of fluoride crystal materials and silicon crystals, and the largest fluoride supplier in China with an annual production capacity of over 100 tons. At the same time, we are also a top supplier of silicon and germanium materials in China with an annual production capacity of over 30 tons.



Optical processing capability

Processable materials:

CaF_2 , BaF_2 , MgF_2 , LiF , Si , Ge , ZnS , ZnSe , UVFS, optical glass and sulfur-based glass, etc.



Processable types:

UM OPTICS has existing flat, spherical and aspheric processing centers, with an annual production capacity of more than 8 million pieces of various types of flat lenses, lenses, prisms, aspheric lenses and other optical lenses.



Optical coating capability

UM OPTICS has an experienced technical team, a good production environment and advanced optical coating equipment and testing equipment. Optical coating products cover near ultraviolet, visible and far infrared wavelengths, mainly focusing on three major types of coating products: laser, infrared and traditional optics. The film system includes reflective film, anti-reflective film, light filtering film, beam splitting film, polarization film and metallization; especially in infrared coating, we have great advantages.



Quality testing guarantees

UM OPTICS has advanced processing equipment and advanced testing equipment, including ultra-precision Single point diamond turning, profilometer, ZYGO planar/spherical interferometer, Fuji interferometer, spectrophotometer, eccentric instrument, goniometer, etc., to protect the quality of component processing and ensure the final product quality meets the requirements.



Single point diamond turning

Profilometer

Spectrophotometer



ZYGO interferometer

Fourier spectroscopy

Salt spray test chamber



Polarized light microscope

Environmental chamber

Ultrasonic cleaner

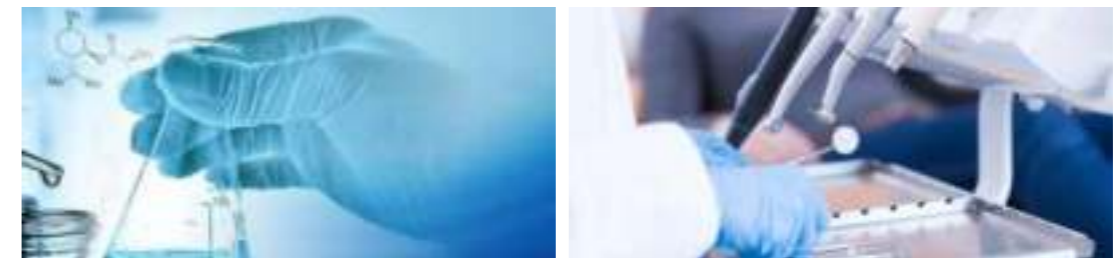
Client Group



Infrared Detection & Sensing

Laser Modules & Systems

Industrial Lens & Machine Vision



Spectral Analysis & Imaging

Biomedical



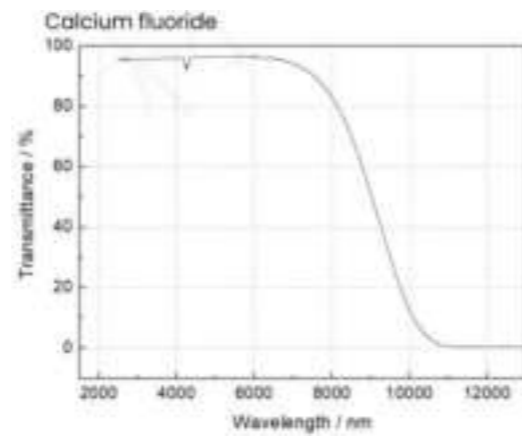
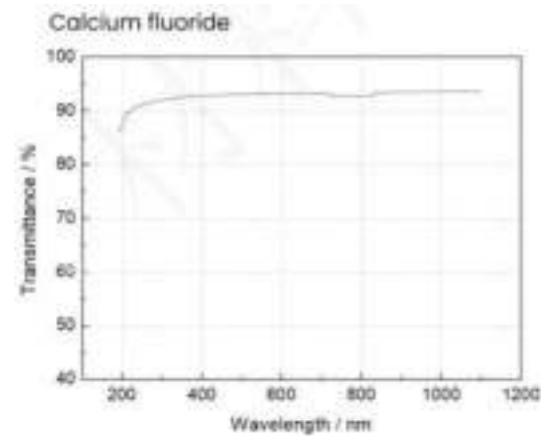
Optical Crystals



Calcium fluoride crystals(CaF₂)

Calcium fluoride is an important optical crystal with high hardness, strong resistance to mechanical shock and thermal shock, as well as good transmittance in the ultraviolet, visible and infrared fields, and is widely used in scientific and technological fields such as lasers, infrared optics, ultraviolet optics, astronomical observation, aerial surveys and high-resolution optical instruments and high-energy detectors.

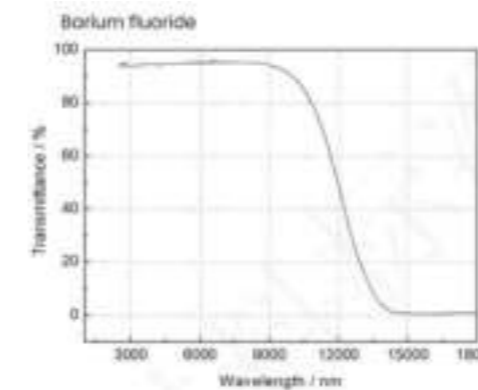
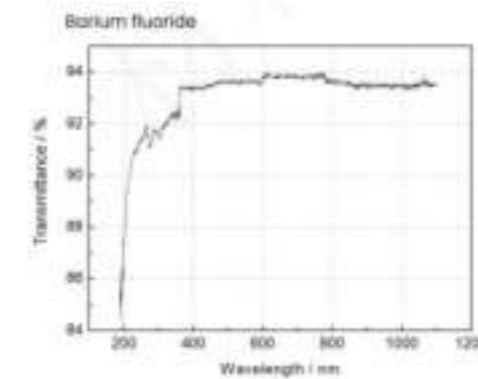
CaF ₂	Material Grade	VIR,UV, VUV, Raman grade,Laser excimer grade, lithography grade, low stress grade
	Max. crystal size	φ420mm
	Growing method	Bridge-man method,CZ
	Crystal Structure	Monocrystalline, Polycrystalline
	Cleavage planes	<111>
	Common crystal orientation	<111>、<100>、<110> etc.
	Transmittance range	130nm-10μm
	Transmittance	>94%@193nm-7.87μm



Barium fluoride crystals(BaF₂)

Barium fluoride crystals belong to the cubic crystal system and have excellent transmittance properties, with high transmittance in the spectral range from UV to IR wavelengths. Due to its excellent optical properties, barium fluoride crystals are widely used in the manufacture of optical components, such as optical windows, prisms and lenses. In addition, barium fluoride has excellent scintillation properties, making it an important crystal material in the fields of high-energy physics and nuclear physics, nuclear medicine, etc.

BaF ₂	Material Grade	VIR,UV,Scintillating Crystals
	Max. crystal size	φ300mm
	Growing method	Bridge-man method,CZ
	Crystal Structure	Monocrystalline, Polycrystalline
	Cleavage planes	<111>
	Common crystal orientation	<111>、<100>etc.
	Transmittance range	150nm-14μm
	Transmittance	>94%@350nm-10.8μm



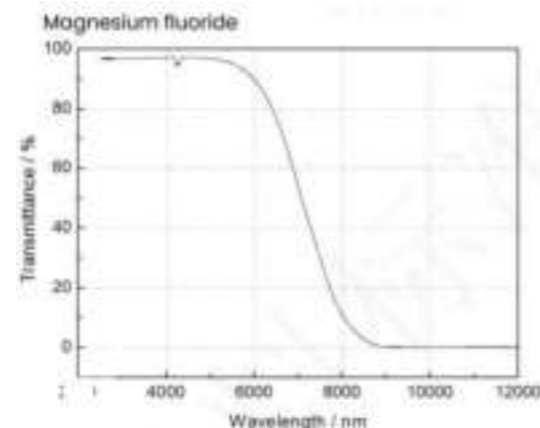
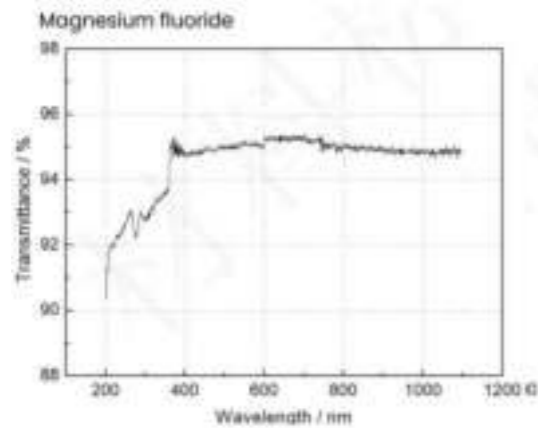


Magnesium fluoride crystals (MgF₂)

Magnesium fluoride crystal is a birefringent crystal with excellent optical properties and can be used as a polarizing element. The material has a very high transmittance in the UV band and is one of the currently known optical crystals in the UV cut-off band. Due to its excellent transmittance in the UV, visible and IR fields, it is widely used in scientific and technological fields such as lasers, IR optics, UV optics and high-energy detectors.



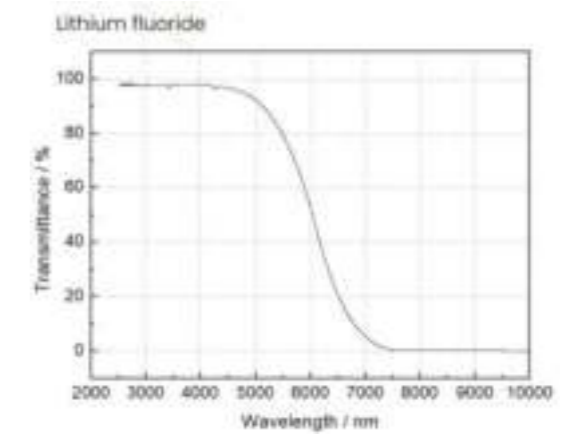
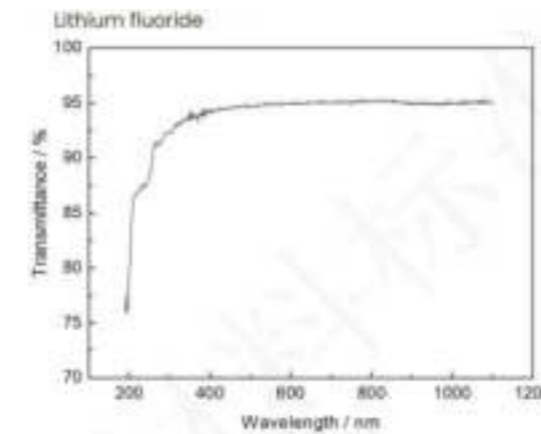
MgF ₂	Material Grade	UV, Deep UV, Extreme UV, Excimer laser, Low stress
	Max. crystal size	φ200mm
	Growing method	CZ
	Crystal Structure	Monocrystalline
	Cleavage planes	<110>
	Common crystal orientation	<001>, <100>, <111> etc.
	Transmittance range	110nm-7.5μm
	Transmittance	>90%@193nm-6μm



Lithium fluoride crystals (LiF)

Lithium fluoride crystals are a material with excellent optical properties, the smallest refractive index among commonly used infrared materials, with high transmittance in the ultraviolet, visible and near-infrared spectral range, and are commonly used as lenses, prisms and windows for thermal imaging systems, aerospace optics and excimer laser optics.

LiF	Material Grade	UV, Deep UV, Extreme UV
	Max. crystal size	φ180mm
	Growing method	CZ
	Crystal Structure	Monocrystalline
	Cleavage planes	<100>
	Common crystal orientation	<100>, <110>, <111> etc.
	Transmittance range	110nm-7μm

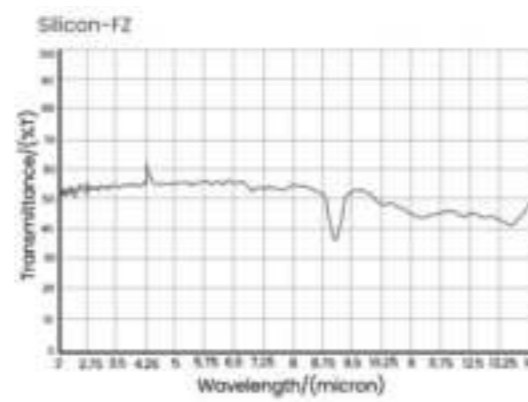
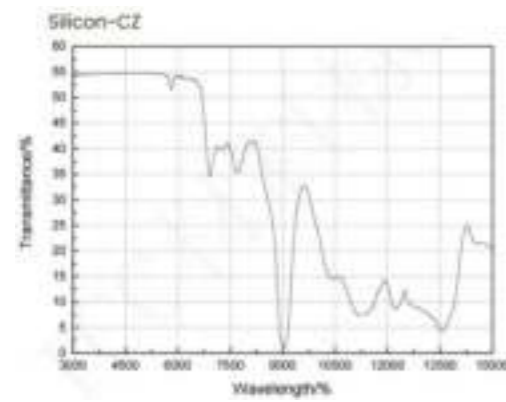




Silicon Crystals(Si)

Silicon single crystal, which is hard and insoluble in water, has excellent light transmission properties in the 1-7 μm band, and it also has excellent light transmission properties in the far infrared band from 30-300 μm, a characteristic not found in other optical infrared materials. Silicon single crystal is usually used for 3-5μm mid-wave infrared optical windows and substrates for optical filters. Due to the good thermal conductivity and low density of this material, it is also a common material for making laser mirrors.

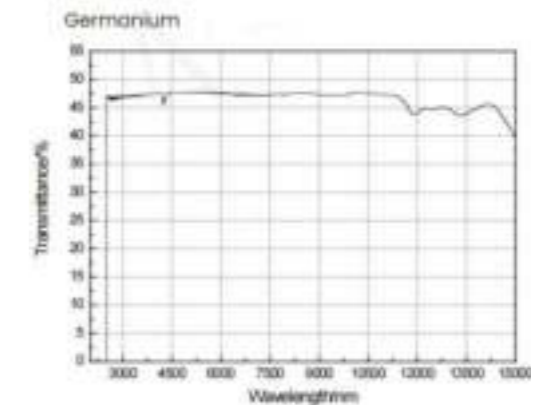
Si	Material Grade	CZ、FZ、Intrinsic silicon
	Max. crystal size	φ300mm
	Growing method	CZ,FZ
	Crystal Structure	Monocrystalline
	Type	N type,P type
	Cleavage planes	<111>
	Common crystal orientation	<111>、<100>、<110> etc.
	Transmittance range	1.2-15μm



Germanium Crystals(Ge)



Germanium single crystal is a very common infrared optical material with high hardness, good thermal conductivity and insoluble in water, which is widely used in infrared thermal imaging and infrared spectrometer systems. Germanium single crystals have good mechanical properties and are ideal for CO2 laser lenses, windows and output coupling mirrors.

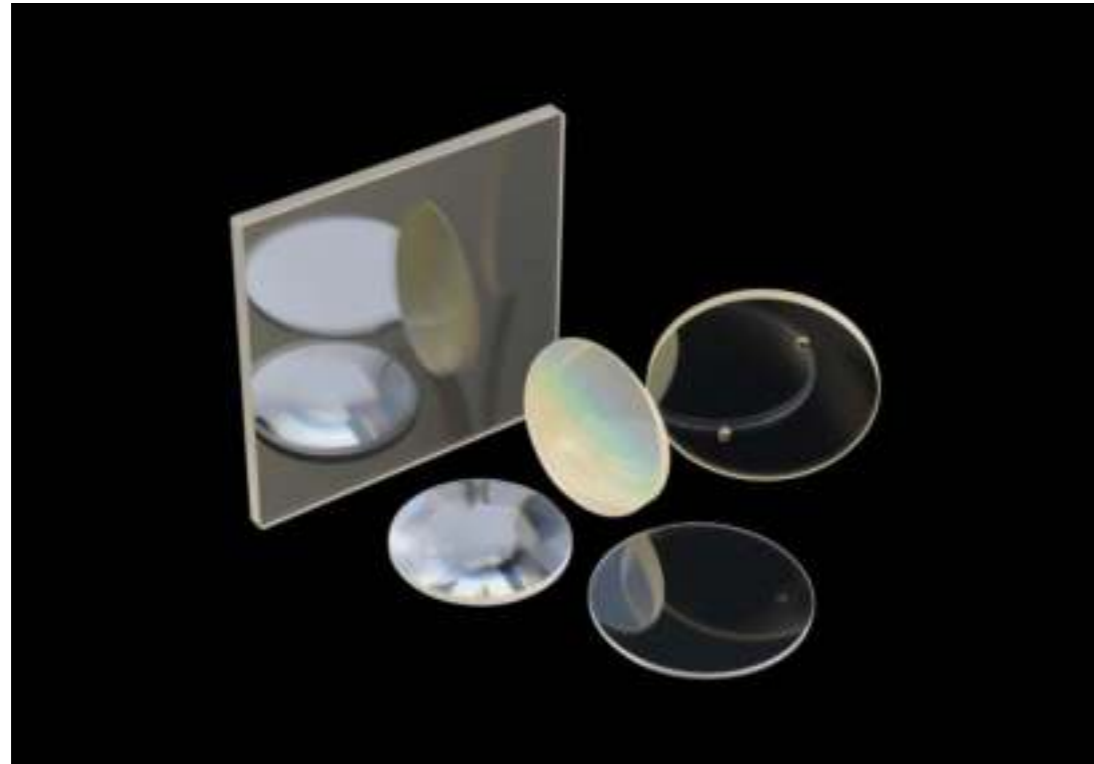


Ge	Material Grade	CZ Ge
	Max. crystal size	φ300mm
	Growing method	CZ
	Crystal Structure	Monocrystalline
	Type	N type,P type
	Cleavage planes	<111>
	Common crystal orientation	<111>、<100>etc.
	Transmittance range	2-15μm

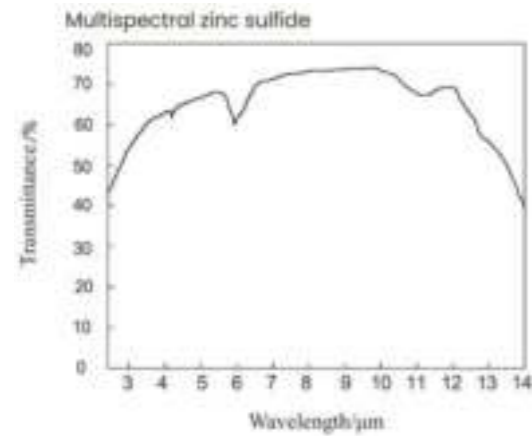


Zinc sulfide crystals(ZnS)

CVD zinc sulfide is characterized by high purity, insoluble in water, moderate density and easy processing, and is widely used in the fabrication of infrared windows, rectifiers and infrared optical components. Zinc sulfide is a material with good refractive index uniformity and consistency, and has good image transmission performance in the 8000nm-12000nm band.



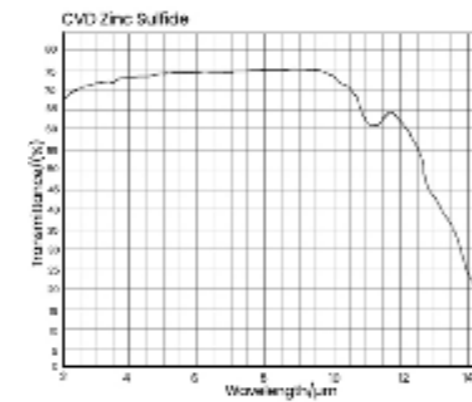
ZnS	Material Grade	CVD ZnS, Multispectral zinc sulfide
	Max. crystal size	φ300mm
	Growing method	CVD
	Transmittance range	0.37-14μm



Zinc Selenide Crystals(ZnSe)

Zinc selenide materials have low optical transmission losses and excellent light transmission properties, making them the material of choice for high power CO2 laser optics. The uniform and consistent refractive index of zinc selenide material makes it also ideal for protecting windows and optical elements in forward-looking infrared (FLIR) thermal imaging systems.

ZnSe	Material Grade	CVD ZnSe
	Max. crystal size	φ300mm
	Growing method	CVD
	Transmittance range	0.55-20μm



Coating Materials

Calcium fluoride coating material

Product: Calcium fluoride
Specification: 1mm, 2mm, 3mm, 4mm, 5mm
Packing: 1kg/20kg/25kg

Barium fluoride coating material

Product: Barium fluoride
Specification: 1mm, 2mm, 3mm, 4mm, 5mm
Packing: 1kg/20kg/25kg

Magnesium fluoride coating material

Product: Magnesium fluoride
Specification: 1mm, 2mm, 3mm, 4mm, 5mm
Packing: 1kg/20kg/25kg

Lithium fluoride coating material

Product: Lithium fluoride
Specification: 1mm, 2mm, 3mm, 4mm, 5mm
Packing: 1kg/20kg/25kg

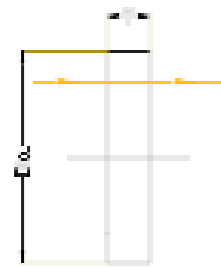




Optical Components

Windows

Window is one of the basic optical components in optics, used to separate the two sides of the environment, so that the interior and exterior of the instrument are isolated from each other, thus protecting the internal devices. Substrate materials of windows include various optical glasses, UV fused silica, CaF₂, BaF₂, MgF₂, LiF, Si, Ge, ZnS, and ZnSe crystalline materials. UM OPTICS offers different types of windows, such as round, rectangular, wedge, drilled and step-shaped.



Technical specifications	
Size	φ3-300mm
Dimensional tolerance	+0/-0.1mm
Thickness tolerance	±0.1mm
Surface quality	20/10 S/D
Surface accuracy	λ/10@632.8nm



Wedge Windows

Wedge windows are commonly used to deflect the incident beam to a specified direction at a certain deflection angle. When used in pairs, the outgoing beam can be positioned in any direction within an angular cone with the incident beam as the axis by the relative rotation of the two optical wedge windows. The high-precision wedge windows can avoid interference effects caused by reflected light from the front and rear surfaces of the highly parallel window, and also avoid optical interference feedback from the laser resonant cavity which leads to poor stability of the laser output, mode jumping, etc.



Technical specifications	
Size	φ3-300mm
Dimensional tolerance	+0/-0.1mm
Surface quality	20/10 S/D
Surface accuracy	λ/8@632.8nm
Angle tolerance	±5'



Spherical Lenses

Spherical lenses can be classified as plano-convex, plano-concave, biconvex, biconcave, and curved moon lenses according to shape function. They can also be classified into single lens and glued lens according to the application. UM OPTICS can provide spherical lenses in various materials such as CaF₂, BaF₂, MgF₂, LiF, Si, Ge, UVFS, glass, ZnS, and ZnSe etc. UM OPTICS has a large inventory of standard lenses available from stock, or we can customize a variety of optical lenses for you according to your application requirements.

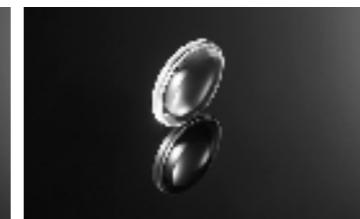


Plano-convex lens

Technical specifications	
Size	φ3-300mm
Dimensional tolerance	+/-0.025
Thickness	0.5-50+/-0.05
Surface quality	20/10 S/D
Surface accuracy	λ/8@632.8nm



Plano-concave lens



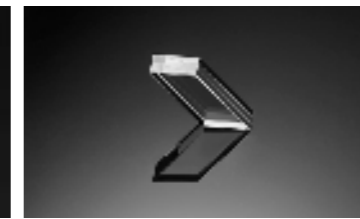
Double-convex lens



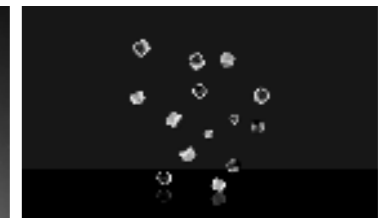
Double-concave lens



Meniscus lens



Glued lens

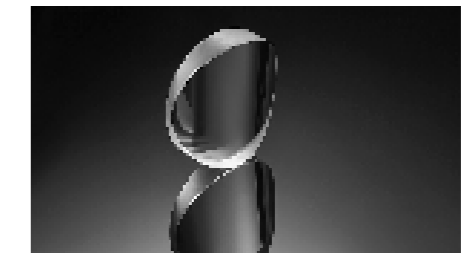


Ultra Small Lens

Cylindrical lens

Cylindrical lens are generally used to converge parallel or diverging beams to a line or to change the aspect ratio of an image. Cylindrical lens can be divided into two structures: plano-convex and plano-concave, both of which are used to converge or diverge beams, respectively. A wide range of materials and coatings of Cylindrical lens are available for UM OPTICS, such as CaF₂, K9, UVFS, Si, Ge and ZnSe, to meet different customer needs.

Technical specifications	
Size	φ3-300mm
Dimensional tolerance	+/-0.025
Focal Length Tolerance	±2%
Surface quality	20/10 S/D
Surface accuracy	λ/8@632.8nm





Galvo Scanning Mirror

Scanning mirror is a kind of light weight rectangular or polygonal scanning reflector, mainly used in laser scanning system. The laser scanning system realizes laser marking, laser drilling, laser internal engraving, etc. through the deflection of the beam deflector consisting of X and Y scanning heads driven by the oscillator motor. UM OPTICS can provide various kinds of mirrors with various spot diameter such as silicon, BK7 and UVFS.

Product Specifications	
Spot diameter	3mm,5mm,7mm,8mm,8.5mm,10mm,12mm,14mm,15mm,16mm,18mm,20mm,30mm,35mm,50mm,70mm,80mm
Wavelength	10600nm,1064nm,1550nm,532nm,355nm,266nm
Surface accuracy	1/8λ- 1/10λ
Surface quality	20-10、 10-5
Coating	Dielectric Film,Metal Film
Length Tolerance	+0.0/-0.1mm
Width tolerance	+0.0/-0.1mm
Thickness tolerance	+0.0/-0.05mm



Silicon Wafers

Silicon single crystal is usually used for 3-5μm mid-wave infrared optical windows and substrates for optical filters. Due to the material's good thermal conductivity and low density, it is a common material for making laser mirrors, infrared temperature measurement and infrared optical lenses. UM OPTICS silicon wafer processing covers all process aspects such as material growth, cutting, polishing, coating, scribing, etc. Quality, delivery and price are strictly controllable; customization is available in bulk.

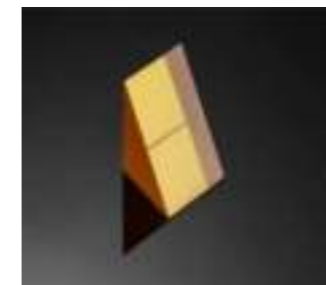


Technical specifications	
Dimensional tolerance	+0/-0.1mm
Thickness tolerance	+0/-0.05mm
CA	>90%
Surface quality	40/20 S/D
Surface accuracy	λ/4@632.8nm

Material	Silicon
Growth method	CZ/FZ
Outer diameter	2"/4"/6"/8"
Thickness	275-1000μm
Conductivity type	N/P
Orientation	<100>、 <110>、 <111>
Resistivity	10-10000Ω.cm
Polishing	Single-sided polishing, double-sided polishing
TTV	<10μm
BOW	<30μm
WARP	<30μm

Right-Angle Prisms

A right-angle prism deflects incident light by 90° or 180°. When light is incident from one right-angle side of the prism, the light will be totally internally reflected at the glass/air interface of the oblique side and exit from the other right-angle side. When the light beam is incident from an oblique plane, the beam will undergo total reflection at the junction of the two right-angle planes and the air, deflect 180° and exit from the oblique plane. UM OPTICS can provide right angle prisms in a variety of sizes.



Technical specifications	
Leg size	5-50mm
Dimensional tolerance	±0.1mm
Angle tolerance	±3'
Surface quality	40/20 S/D
Surface accuracy	λ/4@632.8nm
Coating	Customizable

Wedge Prisms

Wedge prism deflects the incident beam to a defined direction according to a certain deflection angle. When used in pairs, the outgoing beam can be positioned in any direction within an angular cone with the incident beam as the axis by rotating the two wedges relative to each other. UM OPTICS can provide wedge prisms in a variety of materials and sizes.



Technical specifications	
Size	3-300mm
Dimensional tolerance	+0/-0.1mm
Thickness tolerance	±0.1mm
Angle tolerance	±30°
Surface quality	40/20 S/D
Surface accuracy	λ/4@632.8nm
Coating	Customizable



Mirrors

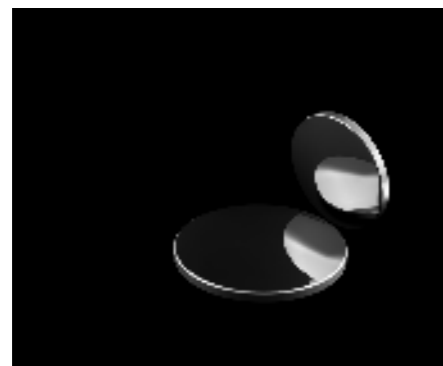
Mirror is an optical element that works by the law of reflection and can be divided into three types according to shape: flat mirror, spherical mirror and aspheric mirror. UM OPTICS can provide mirrors with different shapes and materials, and the main film systems are metal film and dielectric film.



Technical specifications	
Size	3-300mm
Dimensional tolerance	+0/-0.1mm
Thickness tolerance	±0.1mm
Surface quality	40/20 S/D
Surface accuracy	$\lambda/4@632.8\text{nm}$
CA	>90%
Coating	Gold/silver/aluminum film Dielectric Film

Aspheric Lenses

Aspheric optical parts in the optical system can be good to correct a variety of aberrations, improve the quality of imaging. It can replace several spherical parts with one or several aspherical parts, thus simplifying the instrument structure, reducing cost and effectively reducing the weight of the instrument. Micron Optics uses computer-controlled CNC polished aspheric lenses for grinding and polishing, which can achieve better surface flatness and focal deviation.



Technical specifications	
Dimensional tolerance	+0/-0.1mm
Thickness tolerance	±0.2mm
Surface quality	40/20 60/40 S/D
PV	1-3 μm
CA	>90%
Coating	Customizable
Substrate	Si, Ge, sulfur-based glass, ZnSE, CaF ₂ , BaF ₂ , gallium arsenide, Copper, aluminum, acrylic, etc



Single point diamond turning

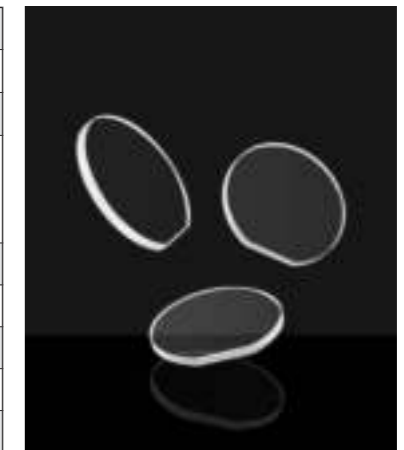


Profilometer

Waveplate

Waveplate, also called phase delay sheet, is an optical element that changes the polarization state of light by generating optical range difference (or phase difference) between two mutually orthogonal polarization components. The incident light passing through different categories of parameters of waveplates when the light emitted is different, can be line polarized light, elliptical polarized light, circular polarized light, etc..

Product Specifications	
Material	UVFS/MgF ₂
Size and tolerance	3-50.8mm+0.0/-0.1mm
Type	Air gap zero-level wave sheet, glued zero-level wave sheet Multi-stage waveplates, etc.
Surface quality	20-10
Wavefront distortion	1/8 $\lambda@632.8\text{nm}$
Parallelism	<1 sec
Phase delay accuracy	$\lambda/100$
Coating	AR/AR



Optical Coating

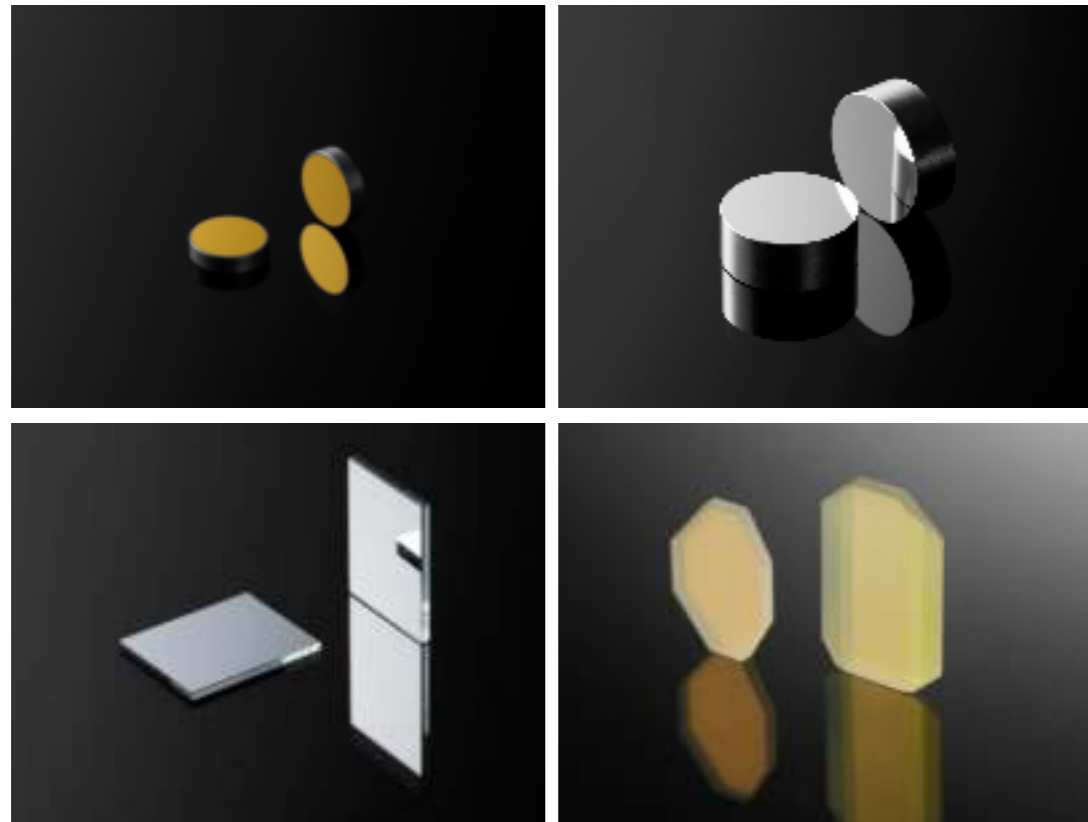
Coating is to coat a transparent electrolyte film or a metal film on the surface of a material by physical or chemical methods, with the purpose of changing the reflection and transmission characteristics of the material surface to achieve the requirements of reducing or increasing light reflection, beam splitting, color separation, light filtering, polarization, etc. UM OPTICS has advanced optical coating equipment and testing equipment, optical coating products cover near ultraviolet, visible, near-infrared, far-infrared wavelengths, mainly laser, infrared, traditional optical three major types of coating products.



Technical specifications	
Substrate	CaF ₂ , BaF ₂ , MgF ₂ , LiF, Si, Ge, UVFS, BK7, ZnSe, ZnS etc.
Coating	Anti-reflective film, DLC, High reflective film, Metal film, Laser film, filter film, spectral film, etc.
Size	Customizable
AOI	0°-45°
Design wavelength	Customizable

Reflective Film

Reflective films can generally be divided into two categories, one is metallic reflective films (gold, silver, aluminum) and the other is fully dielectric reflective films. In addition, there are metal dielectric reflective films that combine the two, the function of which is to increase the reflectivity of the optical surface.



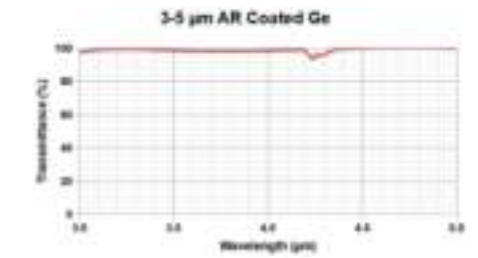
Anti-reflective film (AR)

AR coating is also known as transmission enhancement film, its main function is to reduce or eliminate reflected light from the academic surfaces of lenses, prisms, and plane mirrors, thereby increasing the light transmission of these components and reducing or eliminating stray light from the system. UM OPTICS can provide transmission enhancement films for visible, near-infrared and far-infrared wavelengths.

3-5µm BBAR on GE/SI

Substrate Material: GE / SI / CaF₂

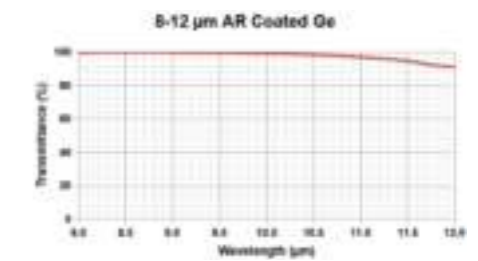
- ◆ 0° AOI AR Coating Line
- ◆ Design wavelength: AR @ 3000-5000NM
- ◆ Both Side AR Reflectance: R<1.5% Transmittance(ave) >97%@3000-5000NM



8-12µm BBAR on GE

Substrate Material: GE CaF₂

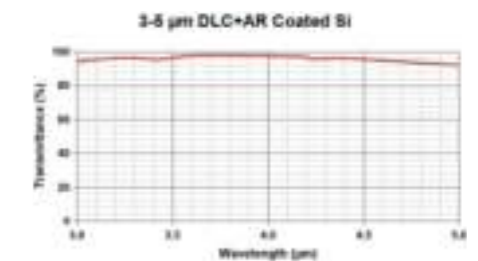
- ◆ 0° AOI AR Coating Line
- ◆ Design wavelength: AR @ 8-12µm
- ◆ Both Side AR Reflectance: R<1.5% Transmittance(ave) >96%@8000-12000NM



3-5µm AR+DLC

Substrate Material: GE / SI

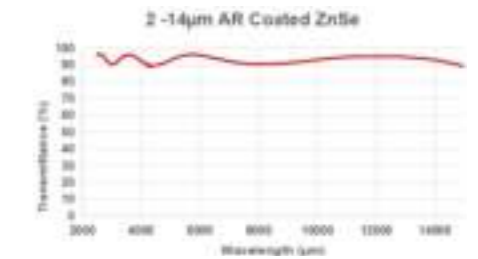
- ◆ 0° AOI AR Coating Line
- ◆ Design wavelength: AR @ 3-5µm
- ◆ Side 1 3-5µm AR & Side 2 DLC
- ◆ Both Side Coating Transmittance(ave) >94%@ 3-5µm



2-14µm BBAR on ZNSE

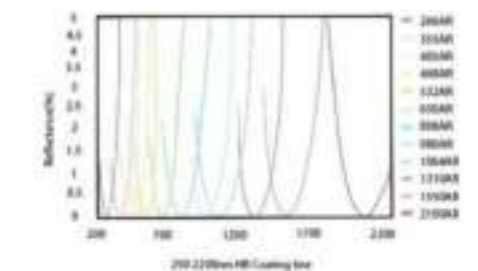
Substrate Material: ZNSE CaF₂

- ◆ 0° AOI AR Coating Line
- ◆ Design wavelength: AR @2-14µm
- ◆ Both Side AR Transmittance(ave) >95%@2-14µm



Laser Films

- ◆ 0° AOI AR Coating Single Laser Line
- ◆ Design wavelength: AR@266nm, AR@355nm, AR@405nm, AR@532nm, AR@650nm, AR@808nm, AR@980nm, AR@468nm, AR@1064nm, AR@1319nm, AR@1550nm, AR@2100nm
- ◆ Reflectance: R<0.2%





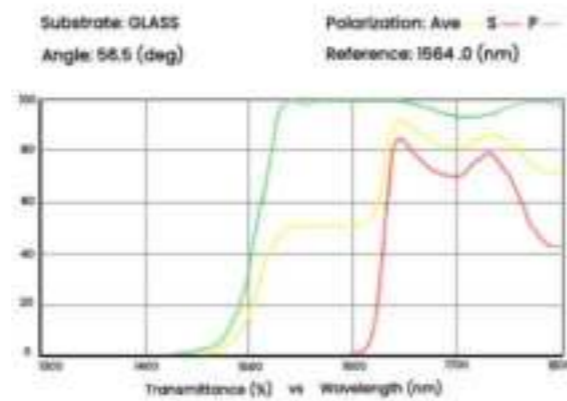
Beamsplitter

A beamsplitter is an optical component used to split the incident light into two different beams at a specified ratio. In addition, a beam splitter can be used to in turn combine two different beams into a single beam.



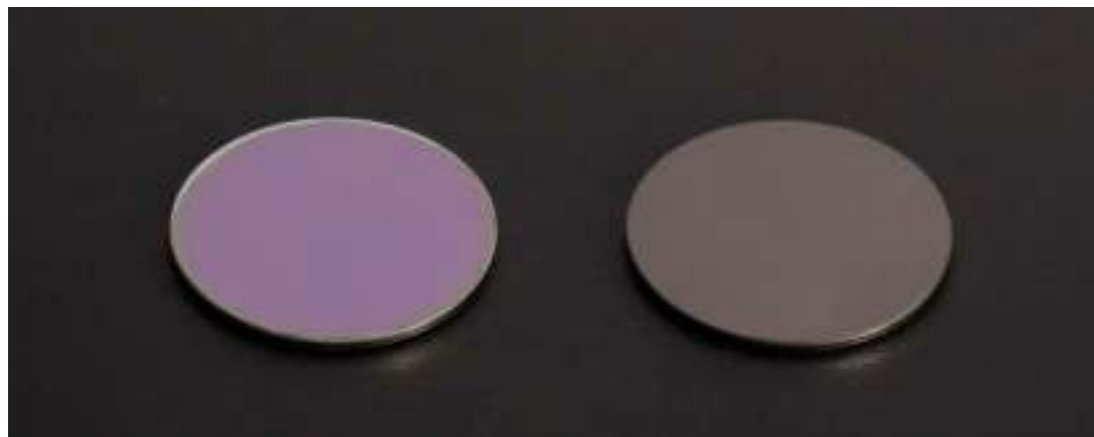
Polarizer

The polarizer has the function of masking and transmitting the incident light, which can make the longitudinal light or transverse light one kind of transmission and one kind of masking. The polarizers introduced by Micron Optics have high laser damage threshold, high transmittance, high reflectance, high extinction ratio and other characteristics, which are widely used in lasers, laser systems, education and research and other products and fields.



Diamond like carbon coating (DLC)

DLC film is mainly used on the surface of germanium substrates as a kind of AR film, or together with other film layers as a AR coating system. It has advantages such as high hardness and corrosion resistance.



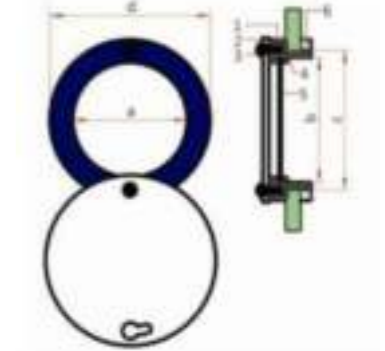
Optical Devices

Infrared temperature measurement window

Infrared window, also called infrared temperature measurement window, is an optical window that can transmit ultraviolet light, visible light and infrared light. By installing the infrared window on the shell of various electrical cabinets such as high-voltage switchgear, city ring network cabinets and motor junction boxes, it is easy to conduct various nondestructive tests on the internal equipment of electrical cabinets by using infrared thermometer or thermal imager to meet the testing requirements of continuous infrared nondestructive testing of most power equipment under the condition of non-stop power supply.



- 1-Metal flange
- 2-Protective cover
- 3-Anti-theft screws
- 4-O-ring seal
- 5-Optical Window
- 6-Ring Nuts



Specification parameters:

Model	UM-60	UM-75	UM-80	UM-100
a	55mm	70mm	75mm	93mm
b	60mm	75mm	80mm	100mm
c	76mm	89mm	95mm	114mm
d	86mm	100mm	106mm	125mm

a: visible diameter b: crystal diameter c: hole diameter d: overall diameter



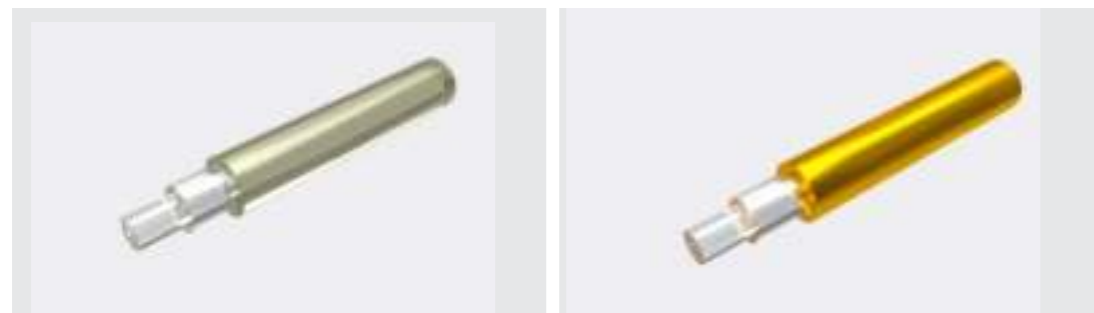
Special optical fiber

UM OPTICS is equipped with special optical fiber drawing line and optical fiber cable extrusion line, with medical grade sterile clean device production workshop, the process is in line with the requirements of ISO9001 quality system, and can provide the whole process of special optical fiber product design, production and testing services, with an annual production capacity of 3000 km of various types of special optical fibers, optical fiber devices more than 1 million production capacity. UM OPTICS is capable of designing and producing optical fibers in a variety of materials and configurations, including anti-UV quartz fibers, deep-UV quartz fibers, visible glass quartz fibers, and near-infrared quartz fibers.



Ultraviolet fiber

UV irradiation resistant optical fiber



Infrared fiber

Polyimide fiber



Square core energy homogenized fiber



Hard plastic clad fiber

Customizable optical fiber



Medical fiber optics



Spectral analysis fiber optics



Lighting fiber

Optical Fiber Products



In-line liquid flow cell



Industrial fiber optic probes