

**INTEGRITY KEEPING,
INNOVATION CREATING,
LIGHT COLLECTING,
ENERGY EMPOWERING!**

宁波天璇新材料科技有限公司

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VERSION 2.0



KEEP ON THE PATH TOWARD INNOVATION
AIMING TO BE A HIGH-POTENTIAL LEADER
IN THE HIGH-PERFORMANCE OPTICAL
MATERIAL INDUSTRY

Meraker

**PRODUCT
MANUAL**

NINGBO MERAK ADVANCED MATERIALS TECHNOLOGY CO. LTD.

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COMPANY PROFILE

Creating a next-generation functional material to control the optical properties better, has always been a dream pursued by the material scientists. And now, this dream is being realized. In 2022, Dr. Mi Zhou led a team and founded Ningbo Merak Advanced Materials Technology Co., Ltd., a company focusing on optical material development and industrialization. Through innovative molecular design and formulation development, combined with novel structure designing and manufacturing technology, remarkable breakthroughs have been achieved in this innovation process, making Merak Tech recognized as a high-potential leader in the high-performance optical material industry.

The core team of the company consists of R&D and business elites formerly working at BASF, WACKER and other first-class multi-national companies, including quite a number of PhDs and masters. With their strong capabilities on the molecular design, synthesis and formulation development of new high refractive index monomers and nanoparticles, long-term experience in the optoelectronic material industry, and rich international supply chain resources, Merak Tech is rapidly commercializing its outstanding optical material products. Meanwhile, Merak Tech has established deep cooperative relationships with Institute of Materials, Chinese Academy of Sciences (CAS) and other renowned institutes to integrate the scientific research resources and industrial needs.

Merak Tech holds a product portfolio of ultra-high/low refractive index optical materials and their derivatives, covering a variety of application areas such as high RI nanoimprint resins, high RI Light Extraction Layer for OLED display, and low RI special optical fiber coatings and adhesives, to serve down-stream manufacturers in the field of Micro-Nano Optics such as diffractive optical waveguides, optical fibers and displays. Notably, the performance of high RI ($n_D=1.7-1.9$) and low RI ($n_D=1.2-1.4$) coating materials is appreciated as a top level in the forementioned industries.

Merak Tech looks forward to working with you through customizing and developing materials to meet your specific needs and provide total solutions!

Keep on the path toward innovation——Merak Tech hopes to cooperate with you to create a better future!

NANOIMPRINT RESIN

Product Overview

Nanoimprinting technology has the advantages of simple process, low cost, high resolution, etc. It is currently widely used in the applications of AR/VR, 3D sensing, LIDAR and wafer-level micro and nano optical device processing.

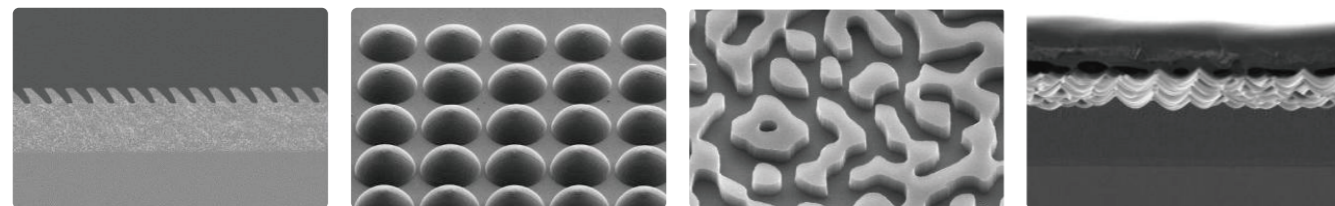
We offer a various lineup of nanoimprint resins that can perfectly suite for Micro-Nano Optics applications.

- Adjustable refractive index between 1.4 and 1.9
- Suitable for UV light curing
- Thicknesses ranging from 100 nm to 100 μm
- High transmittance, low haze, high reliability
- Specific parameters can also be customized upon request

Technical Parameters

Products	NP 9302A	NP 8306A	NP 5302A	NP 7301A	NP 7007B	NP 6001A	NP 5001A	NP 4003A
Refractive index (n_D)	1.90	1.83	1.54	1.73	1.72	1.60	1.56	1.41
Viscosity (cps)	2~5	2~5	2~4	8~10	460~660	400~500	300~400	420~480
Solvent	Yes	Yes	Yes	Yes	No	No	No	No
Transmittance	>95%	>95%	>90%	>95%	>95%	>95%	>99%	>99%
Haze	0.30	0.25	0.20	0.20	0.41	0.40	0.40	0.30
Processing	Spin/slit coating + nanoimprinting							
Curing method	UV light curing							
Major application	AR/VR/3D Sensing	For process adjusting	AR/VR/3D Sensing					

Application Scenario



AR diffractive waveguide

Micro Lens Array

DOE

Diffuser

NANOIMPRINT PRIMER

Product Overview

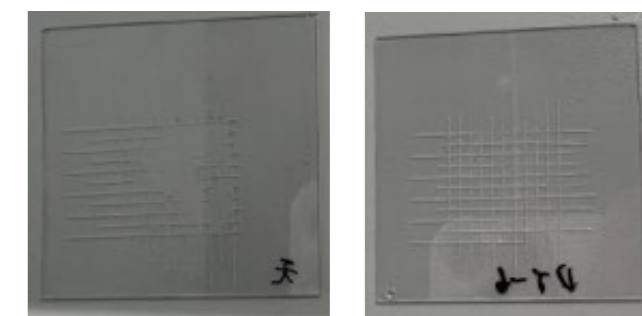
Strong adhesion between the nanoimprint resin and the substrate is required in the processing of micro- and nano-optical products.

DT-6 coating could effectively improve adhesion between nanoimprint resin and glass substrate.

- Primarily suitable for acrylic-type resins, the result of adhesion test can be enhanced to 4B or more
- Suitable for Spin coating
- Layer thickness below 10 nanometers
- High transparency and excellent weatherability, resistant to boiling, high temperature and humidity, and QUV testing

Optical resins
Substrates

DT-6



No adhesion

With adhesive layer

Technical Parameters

Characteristic	DT-6		
Appearance	Clear Liquid		
Solvent	Propylene glycol monomethyl ether		
Viscosity (cps)	2.0 @ 25 °C		
Liquid refractive index	1.40 @ 586 nm		
Weatherability(Film)	Boil	80 °C, >2h	Color difference <0.2. Adhesion effect 5B
	High temperature and humidity	85 °C/85% RH, >500 h	Color difference <0.35
	Thermal shock	85°C/-40°C, 30 min/temp. >120 cycles	Color difference <0.2. Adhesion effect ≥4B
	QUV	UVA 340 nm, 0.9 W/cm ² , 60 °C >4500 mJ/cm ²	Color difference <0.5, adhesion effect ≥4B

OLED LIGHT EXTRACTION LAYER

Product Overview

Based on high refractive index UV-curing resin, it can realize the functions of light gathering, and reflection reduction. Products include:

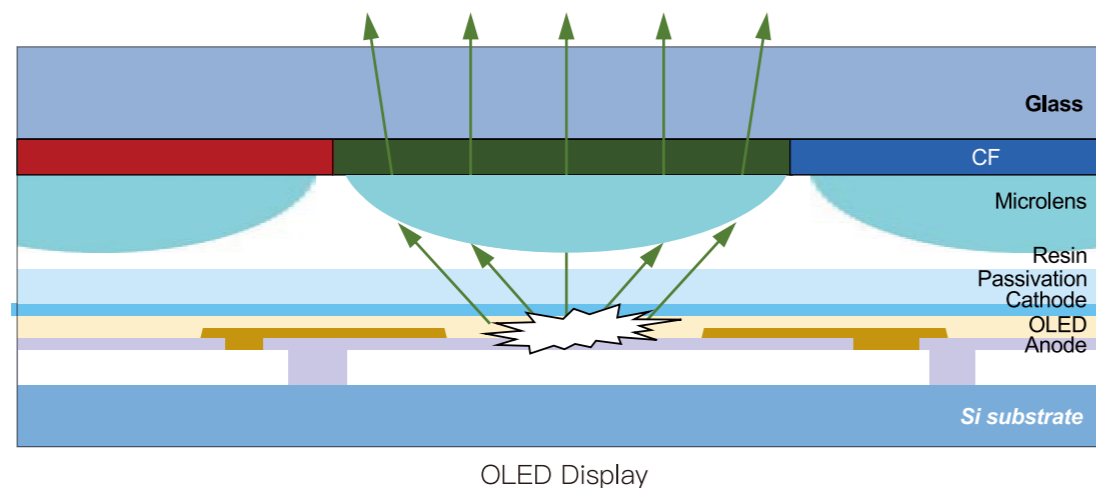
- Microlens array (MLA) structures with high refractive index: already commercialized in OLED displays and microdisplays, which can significantly increase the light output efficiency;t
- A combination of high and low RI materials is used to achieve a broad spectrum of reflection reduction.

We can provide high refractive index coatings with refractive index between 1.6 and 1.8, and the specific parameters and indexes can be customized upon request.

Technical Parameters

Products	IJ7201A	H7302A	IJ6201A	H6101A
Refractive Index (nd)	1.74	1.66	1.62	1.60
Viscosity (cps)	25-30	6-10	20-30	2000-3000
Solvent	Yes	Yes	No	No
Transmittance	>97%	>90%	>95%	>95%
Haze	0.40	0.40	0.35	0.95
Processing	Printing	Coating	Printing	Coating
Curing Method	UV Light Curingt			
Major Application	OLED/Micro-OLED Display Microlens			

Application Scenario



ANTI-REFLECTIVE COATINGS

Product Overview

Low refractive index UV-curing resins have been widely used in the direction of anti-reflective coatings.

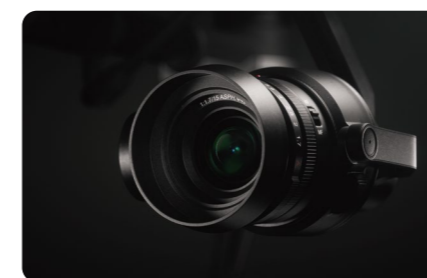
Low refractive index resins for anti-reflection are used independently or in combination with the high refractive index resins to realize excellent anti-reflective effect:

- The refractive index is adjustable between 1.2 and 1.4, and the specific parameter can be customized
- Print or conventional wet coating
- Alternative to sputtering process and reduces cost significantly

Technical Parameters

Products	L4002A	IJ3301A	L2301A
Refractive index (nd)	1.41	1.34	1.24
Viscosity (cps)	320-480	8-12	5-7
Solvent	No	Yes	Yes
Processing	Coated	Printable	Coated
Transmittance	>99%	>99%	>99%
Haze	0.30	0.26	0.31
Curing Method	UV Light Curing		
Applications	Anti-reflection Coatings For Lenses, Solar Cells, Etc		

Application Scenario



Lens Anti-Reflection Coating



Anti-reflective Coating For Protective Film And Polarizer



Solar Cell Anti-Reflective Coating

FIBER-CHIP COUPLING ADHESIVE

Product Overview

It is a new type of UV-curable resin with low refractive index, which can be used for bonding optical fiber and chips. The material has a moderate viscosity and is suitable for a variety of bonding processes, and can also be developed according to customer requirements.

Key Product Features:

- Good optical properties after curing
- Good heat resistance
- Good adhesion to optical fiber, grindable

Technical Parameters

Items	OA5001A	OA4001A
Appearance	Transparent Liquid	Transparent Liquid
Solid Content (%)	100	100
Viscosity (cps)	400±50	400±50
Liquid Refractive Index (nd)	1.49	1.44
Cured Refractive Index (nd)	1.51	1.45
Shore Hardness D	83	81
Bonding Strength (Kgf/cm2)	>140	>120
Main Applications	Optical Fiber And Optical Chip Bonding	

Application Scenario



Optical Chip

OPTICAL FIBER COATING

Product Overview

A new type of UV curing resin with low refractive index, which can be used for manufacturing energy transmission optical fiber, lighting optical fiber and so on, to confine the light path in the silica core-cable. With moderate viscosity, the material is suitable for various coating processes, and can also be customized and developed according to customers' requirements.

Product Key Features:

- Low refractive index after curing, good adhesion performance
- High modulus of elasticity, good heat resistance

Technical Parameters

Product (25°C)	LF4101A
Appearance	Transparent Liquid
Solid Content (%)	100
Viscosity/cps	3000±500
Refractive Index (liquid)	1.39
Refractive Index (film)	1.40
Refractive Index (liquid)	18
Modulus Of Elasticity (MPa)	300
Rupture Strength (MPa)	15
Major Application	Total Internal Reflection In Optical Fibe

Application Scenario



Energy-transmitting Fiber

ANTI-STATIC COATING

Product Overview

With the advantages of being environmental friendly, high dilution ratio, stretchability and stability, it is suitable for permanent antistatic coating of various plastic film substrates (e.g. PET, etc.).

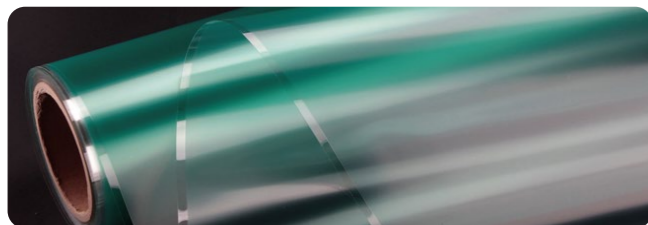
Key Product Features:

- Good anti-static effect after thermal curing
- Excellent resistance to moisture and heat

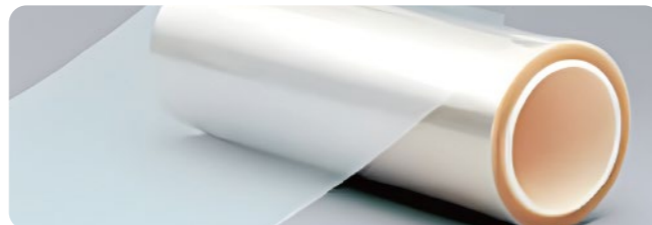
Technical Parameters

Product Feature		KT100	
		KT100-A	KT100-B
Stock Solution	Appearance	Dark Blue Liquid	Colorless Liquid
	Solid Content	30%	70%
Coating solution preparation	At The Same Dilution Ratio	KT100-A: KT100-B=133: 1	
Coating Film (From 0.35% solution)	Adhesion Test By Cross Cut	4-5B	
	Pencil Hardness	1H	
	Transmittance	88% (Substrate 88.1%)	
	Haze	3.4 (Substrate 3.33)	
	Surface Resistivity	10 ^{4.5} -10 ⁵ Ω/Square(10# Wire Bar Coated)	
	Solvent Resistance	Resistant To Ethanol And Other Solvents	
	Heat And Humidity Resistance	Passes 500 Hours Of Testing Under 85°C/85% Rh Conditions	
Main Application	Antistatic Coating On Pet/pc And Other Substrates		

Application Scenario



Coating For Protective Film



Coating For Release Film

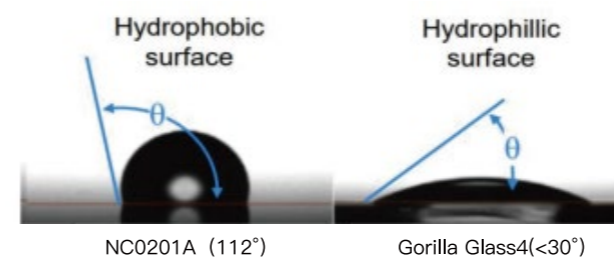
HYDROPHOBIC NANO HARD COATING

Product Overview

Commercially available PFPE (Perfluoro Polyether) as single-layer coating could not provide surface hardness and typically requires vacuum processing conditions.

Our NC0201A nano-coating:

- Combines excellent hydrophobicity and high surface hardness
- Easy processing by spraying, bar-coating and other simple coating conditions, can reduce process costs
- Widely used on glass, metal, stone and other substrates
- High durability and long time stability



Technical Parameters

Items	NC0201A
Processing	Spray Coating, Bar Coating
Suitable Substrates	Glass, Metal, Stone, Etc.
Water Contact Angle	>112°
Pencil Hardness	9H
Optical Transmittance	>98%
Abrasion Resistance	Steel Wool & Non-woven Fabric > 2000 Times
Chemical And Thermal Stability	High
Main Applications	Hydrophobic Coating On Metal/glass/stone Surfaces

Application Scenario



Anodized Metal Surface



High-end Bathroom Tile Surfaces



Brushed Metal Surface

FUNCTIONAL HARD COATING

Product Overview

High hardness UV-curable fluid for film materials such as PET, TAC and PC.

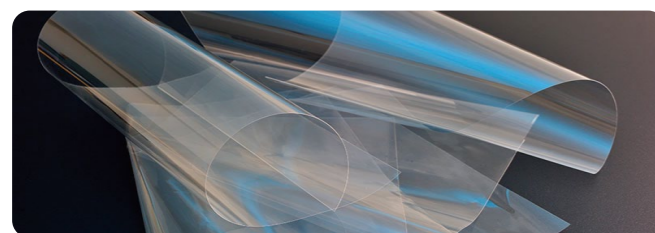
Functional hard-coating:

- Suitable for bar, micro-concave and slit coating
- Fluid can be diluted according to different coating process
- Cured films have high hardness and scratch resistance
- Provide customized solutions

Technical Parameters

Features	Products	NH0201A	NH0202A
Liquid	Solid	45%	45%
	Stickiness	<20cps	<20cps
	Recommended Dilution Solvents	Butyl Acetate Or\and Methyl Isobutyl Ketone	Butyl Acetate Or\and Methyl Isobutyl Ketone
Film	Adhesion	5B	5B
	Pencil Hardness	750g/2H	750g/2H
	Optical Transmittance	>88%	>88%
	Haze	<1%	<1%
	Abrasion Test	#0000 Steel Wool, 1kg,1000 Times, Pass	#0000 Steel Wool, 1kg, 1000 Times, Pass
	Surface Resistance	10Ω/Square	/
Major Application		Functional Coating On Pet Or Pc Base Film	

Application Scenario



Optical Functional Coating Films



Decorative Coating Films

SPECIAL OPTICAL ADHESIVES

Product Overview

- OCR Liquid Optical Adhesive: Flexible folding screen lamination application in OLED display, solvent-free optical adhesive OCR4201A is a new ink-jet printing solution for replacing adhesive OCA film.
- High Refractive Index Optical Adhesive: H7401A can be applied in high refractive index optical lens bonding, with strong adhesive force, high transparency, it can effectively reduce the optical loss between the lens interface.
- Optical Pressure Sensitive Adhesive: PS4401A is a solvent-free pressure sensitive adhesive, which can form a colorless and transparent adhesive layer under UV irradiation. It have high adhesion to a variety of substrates, and suitable for colorless tapes, labels, and optical film layers bonding.

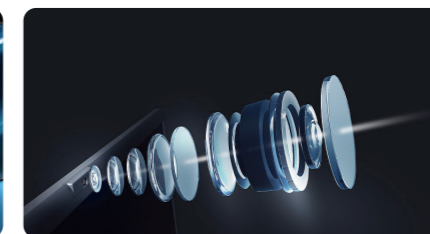
Technical Parameters

Products	OCR4201A	H7401A	PS4401A
Refractive Index (n_d)	1.49	1.70	1.5
Viscosity (cps)	26	2000	2500
Solvent	No	No	No
transmittance	99%	>95%	95%
Peel Strength (gf/inch)	1000	-	4200
Processing	Printable	Dispense Glue	Coated
Curing Method	UV Light Curing		
Major Application	Oled Flexible Screen Lamination	Optical Lens Bonding	Tapes, Labels, Optical Film Bonding

Application Scenario



Oled Display Lamination



Optical Lens Bonding



Optical Film Bonding

INTEGRATED SOLUTIONS



Coating Category

- Antistatic coating
- AR\AF Coating
- Ultrapure wet chemical solvent\cleaner
- Epoxy glue
- PET prime coating



Customization

- Quantum Dot development
- Special adhesive film coating



Membranes

- UV anti-stick membrane for Wafer Dicing, OLED Packaging
- Projection film for Projection Display
- PI film for OLED, flexible LED strip, transparent FPC



Imported Chemicals

- Coating chemical additives
- Encapsulation chemical additives
- Thermally conductive chemical additives