

CHEMISTRY THAT MATTERS™



RESINS IN OPTICAL LENSES

ULTEM™ AND EXTEM™ HIGH HEAT RESINS

Florian Jung, SABIC's Specialties Business
EPIC Online Technology Meeting on Photonics for Wearables, July 10, 2023



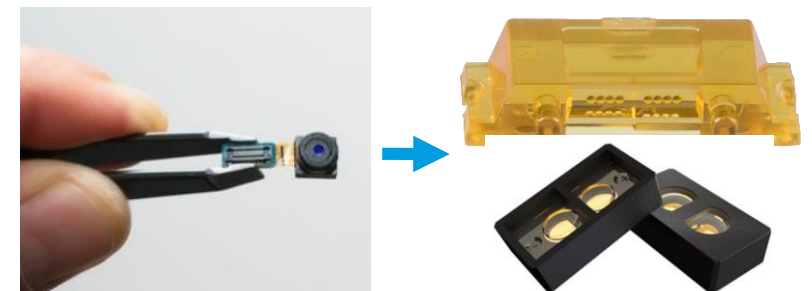
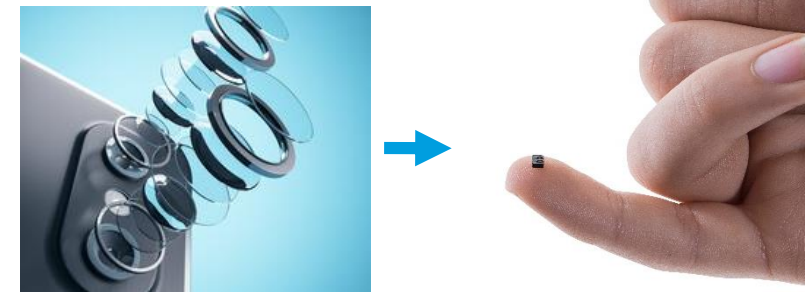
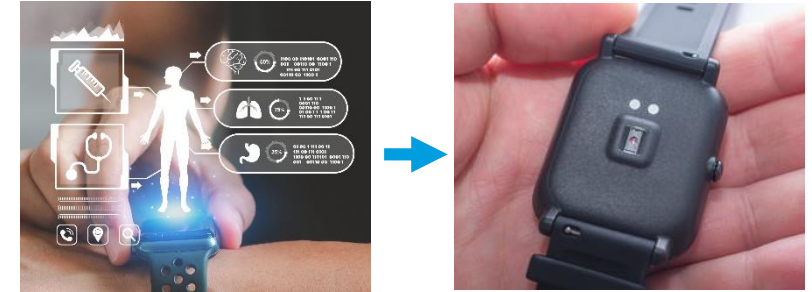
GET MORE FOR YOUR WEARABLES

Increased functionality of wearables does require integration of **multiple sensors** into **one device**.

SABIC, supplier of remarkable **RESINS** in optical lenses, is eager to solve some of your main design and development challenges IF:

1. You seek for options to reduce **packaging size** and need the optics to survive solder reflow temperatures
2. You need **maximum scalability** to produce millions of parts a year
3. **Design freedom and function integration** are a key focus in your development work, ie aspherical lens (array) or different material combinations

Larger build rates. Easier Design. Simpler Assembly.



WHY WE CAN DO IT

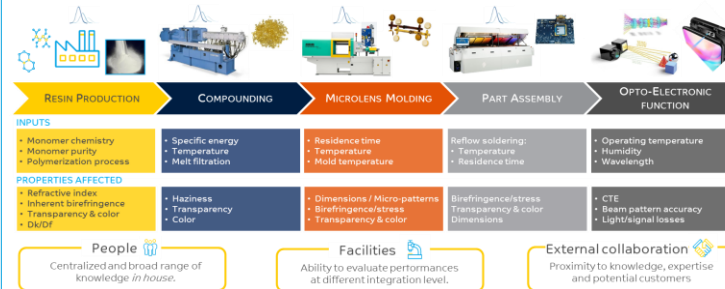
Processing

- **Injection micro molding** utilizing highest performance polymers
 - **Freeform optics** integrating multiple lenses in one optical element
 - **Multi-cavity molding** and automation ensure high reproducibility in combination with scalability up to **100MM pc/a**



Development Support

- We support our customers together with our partners from **part design** to **mass production** and from **reflow soldering test** to **assembly processes**



- SABIC operates several **R&D centers globally** to deliver support where you need it the most

Global footprint

- Specialty Thermoplastics are us


Top 2
Chemical Brand
Value*


31,000
Employees
around the world


66
World-class
plants worldwide


50
Countries
of operations

46,6
US\$ bn
Annual
revenue


10,900
Global patent
filings



- **2nd** largest global chemical company
- 35,000 employees in **50 countries**

WHY WE CAN DO IT

Materials that can deliver easier design and simpler assembly

- A leading manufacturer of transparent thermoplastic resins combining **high near IR transmission**, **dimensional stability** and high **heat resistance**

ULTEM™ AND EXTEM RESIN OPTICAL PARAMETERS*

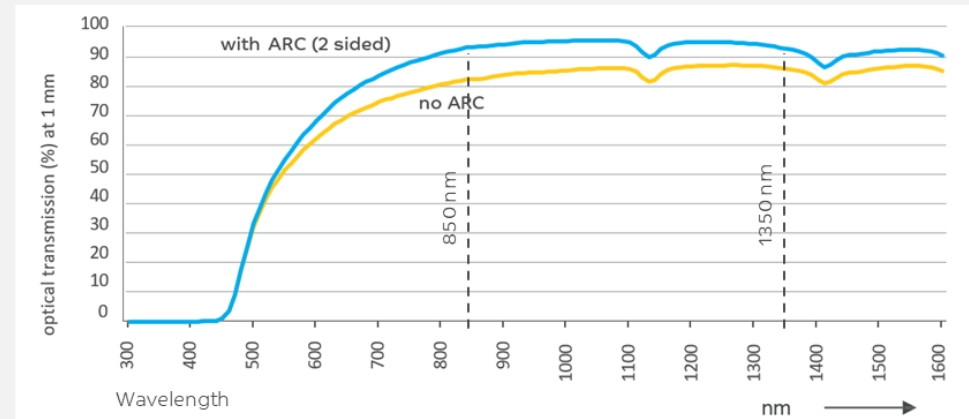
Property	ULTEM™ 1010 resin	EXTEM™ XH1015UCL resin	EXTEM™ RH series resin (ER015681)
HDT, 0.455 MPa, 3.2 mm	200 °C	252 °C	269 °C
1 mm % T 850 nm	88	82	87
1 mm %T 1310 nm	89	87	88
850 nm Refractive Index	1.639	1.633	1.639
Abbe Number	21	18	18
Dn/dT (30 °C – 120 °C)	-9.8 x 10 ⁻⁵ /°C	-9.8 x 10 ⁻⁵ /°C	-9.8 x 10 ⁻⁵ /°C

* The data shown are typical properties and may vary from lot to lot

ULTEM™ and EXTEM™ RH resin show excellent light transmission for near Infrared optical sensing

In addition, anti-reflection coatings (ARC) can help reduce first surface reflection losses, improve contrast and boost the transmission. This can enable a higher sensitivity for optical sensors or lower signal losses for fiber optical connectors.

ULTEM™ RESIN EXAMPLE : EXTERNAL TRANSMISSION (%) AT 1 MM, AS FUNCTION OF WAVELENGTH, WITH AND WITHOUT ANTI REFLECTIVE COATING (ARC)



Near IR: 800-1000 nm for proximity sensing

Short wave IR: 1000 -2000 nm for biometric sensing

Light collimation through our resin, with excellent near IR transmission for detection of biomarkers

NO EXCUSES - YOU NOW KNOW WHERE TO FIND US

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THANK YOU

