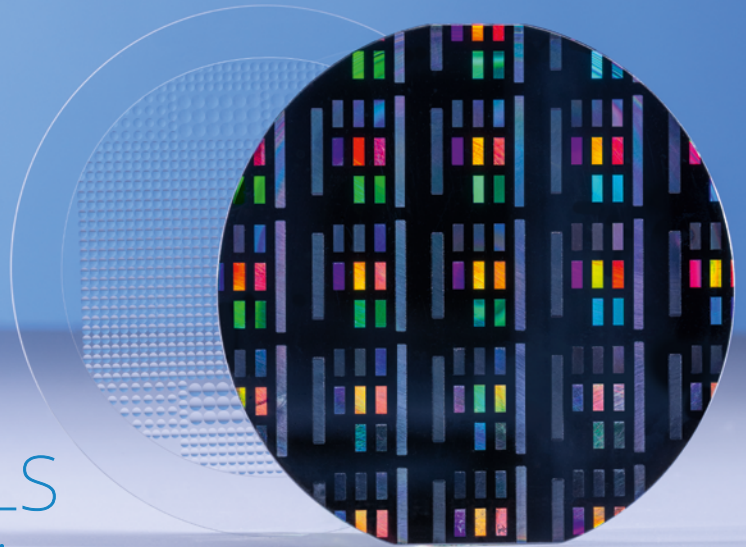


# OPTICAL MATERIALS for wafer level micro optics



## How they work

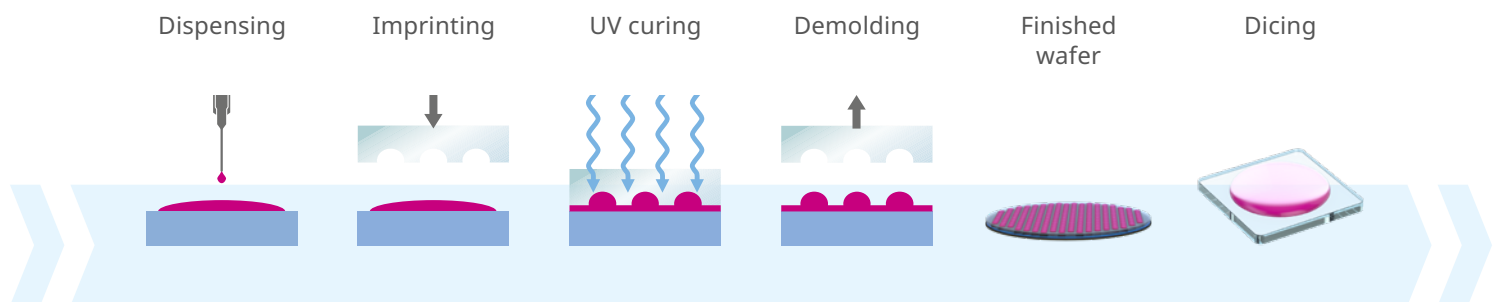
Optical materials and adhesives play a crucial role in the development and manufacturing of wafer-level optics. They are not only used to attach and protect optical elements such as sensors or LEDs, but also to manufacture optical components.

DELO's optical materials are used to manufacture microlenses and diffractive optical elements (DOE) in imprint processes. These are used in 3D sensors in smartphones or as microlens arrays (MLA) in projection systems and automotive headlamps.

## Imprint process

The imprint process, also known as nanoimprint lithography (NIL), allows for efficient and high-quality replication of optical elements directly at wafer-level. With the ability to fabricate 2.5D structures in a single process step, wafer-level imprinting is a versatile and cost-effective mass-manufacturing process especially suited for miniaturized optics with high functionality and dense packaging.

The process starts with the dispensing of the liquid material on a substrate, typically glass. After imprinting the optical structure with a transparent stamp, the material will be cured in place by UV light. The demolding of the stamp leads to the finished optical structures on the glass wafer, which can be separated by a dicing step in the end.



(Adhesives / polymers are represented in magenta in all illustrations)

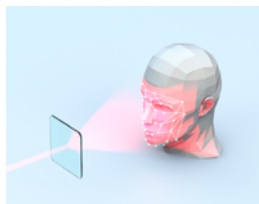


Discuss your project and your requirements  
with our experts:

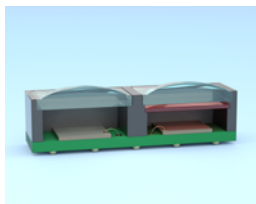
[photonics@DELO.de](mailto:photonics@DELO.de)

# Applications

## 3D sensing



## Ambient sensing



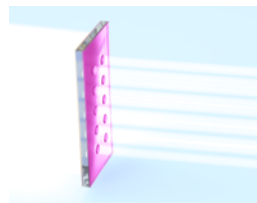
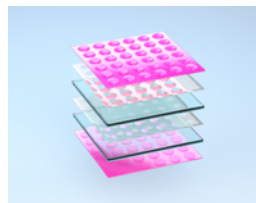
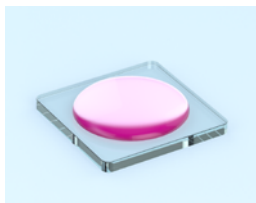
## AR / MR



## Headlamps



## Projection



# Material solutions

## Optical solutions

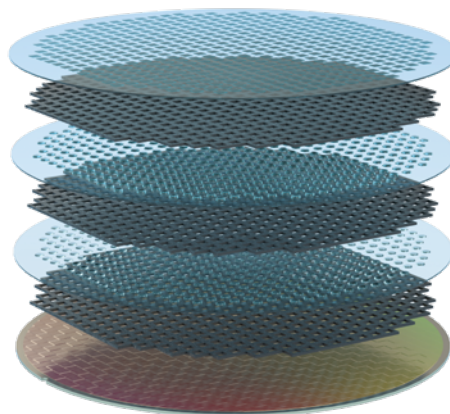
- › Nano structures
- › Lens structures
- › Encapsulation

## Functional solutions

- › Light blocking
- › Diffusor material
- › Filter material

## Process solutions

- › Wafer bonding
- › Wafer stacking
- › Stamp material



# Process capabilities

In order to develop matching materials for the various processes used in optics manufacturing, we test our newest product developments using state-of-the-art inhouse equipment. An **imprint machine** allows us to create nano- and lensimprints, the **inkjetter** and other

**jetting valves** are used for dispensing the material and **spin coating** or **screen printing** processes provide further options for applying the liquid material on different substrates for various thicknesses.

# DELO

## DELO Industrial Adhesives

China | Czechia | France | Germany HQ | Italy | Japan  
Korea | Malaysia | Singapore | Thailand | USA

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