Nanoimprint lithography on full wafers that saves process steps by directly producing a hard etch mask or functional optical layer

Summary

Profile type
Technology offer

Company's country
Netherlands

POD reference
TONL20230106010

Profile status
PUBLISHED

Type of partnership
Commercial agreement with technical assistance

Targeted countries
• World

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Term of validity
6 Jan 2023
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General Information

Short summary

A Dutch spin-off SME is specialized in nanoimprint lithography. Most important advantage is the ability to make very high resolution nano and micro structures on large wafers of up to 300 millimetres at easy scalable volume and low costs through a reduction of process steps. The SME is interested in commercial agreements with technical assistance to companies interested in developing and producing both low and high volume wafer based nanostructured products.

Full description

A Dutch spin-off SME develops and sells machines, materials and processes for nanoimprint solutions. The SME is specialized in ‘Substrate Conformal Imprinting Lithography’ (SCIL). SCIL is a cost effective, robust, high yield process enabling nanometre resolution on a large variety of substrates. Satisfying the rapidly increasing demand for products with nano imprinted components, SCIL delivers proven, high quality imprints on large areas up to 300 millimetres. It can be used to make nano and micro patterns with feature sizes down to less than 10 nanometres. And because of the unique properties of the used imprint sol-gel material resist that is applied by capillary action, SCIL saves time by directly producing a hard-etch mask or functional layer.

Unlike conventional lithography processes, SCIL has fewer defects. Compared to other imprint lithography processes SCIL causes less damage to the materials thanks to its soft conformal stamp. Patterns are imprinted over particle contaminants and distortions are dissipated in the soft rubber layer. Improving yield, this results in lower operation costs and high quality output of the produced products on the wafers.

Single layer nano-patterning is a key process step for a multitude of applications. Nanoimprint lithography solutions can be used to create functional structures at nano scale enabling manufacturers of light emitting diodes substrates, lasers, micro optical devices, (bio)sensors, solar cells, display covers, micro electromechanical systems (MEMS), photonic crystals and many other products to increase performance and reduce costs.

The Dutch SME is interested in commercial agreements with technical assistance with manufacturers of wafer based products with nano (and micro) patterns.
To come to the wafer based products the Dutch SME will support the manufacturer with in-house wafer production with:
- R&D and process development
- Tooling and processes for small series and high volume production
- Mature supply chain of sol-gel resist materials
- Dedicated processes for their requirements.

The partner is desired to produce the wafer based products and/or to be active in the value chain from engineering to sales of concerning wafer based products.

Advantages and innovations

The offered Substrate Conformal Imprinting Lithography (SCIL) technology has a number of benefits, advantages and innovations.

Most important advantage and innovation is that the SCIL nano patterning technology has a good etch resistance with a directly patterned hard etch mask that saves two process steps and time. Another advantage is a good thermal stability with directly patterned functional layers. Transparency makes it suitable for optical applications (products with nano patterns with feature sizes down to less than 10 nanometres) from ultraviolet to infrared. Patterning of more layers is possible.

A number of benefits are:
- A large contact area
- No damage to stamp or substrate
- Low cost stamp with extended life time
- Multiple stamps from one master
- Lower flatness requirement of substrate
- Freedom of resist type (organic, inorganic, hybrid)

The offered nanoimprint lithography is a cost effective, robust high quality and high yield process for the creation of both nano and micro patterns on wafers. Once ready to go into volume production an automated process ensures easy scalability of up to 60 wafers per hour. The dimensions of the wafers may vary from 2 inch – 12 inch (50 millimetres – 300 millimetres).

Technical specification or expertise sought

Stage of development

Already on the market

Sustainable Development goals

- **Goal 9: Industry, Innovation and Infrastructure**

IPR Status

Secret know-how

Partner Sought

Expected role of the partner

Type of partner:
Industry, research connected to industry

Partners:
Manufacturers of wafer based products with nano patterns, foundries, organizations with in-house wafer production. The desired partner(s) should be interested in a cost effective, robust, high quality and high yield process and the reduction of a number process steps in the value chain of producing wafer based products.

Role of the partner:
The partner is desired to manufacture wafer based products and/or to be active in the value chain of the production of wafer based products.

The Dutch SME offers solutions for reducing a number of process steps by directly producing hard-etch masks or functional layers based on a Substrate Conformal Imprinting Lithography Technology.

Type of partnership

Commercial agreement with technical assistance

Type and size of the partner

- **R&D Institution**
- **SME 11-49**
- **SME 50 - 249**
- **Big company**

Dissemination

Technology keywords

- **005010 - Micro- and Nanotechnology related to physical sciences**
- **001001010 - Nanotechnologies related to electronics & microelectronics**

Market keywords

- **03001004 - Other semiconductors**
- **03001001 - Semiconductors**

Targeted countries

- **World**

Sector groups involved