



**IQS**  
GROUP

# **IQS GROUP**

**“We are architects in the nanoworld.  
We use sophisticatedly designed and calculated  
nanostructures to give materials and products  
new amazing functions and features.”**

Tomáš Těthal, CEO, IQS Group



## **IQ STRUCTURES**

Influences the world of the protection of banknotes, identity documents, valuables and goods against fraud and counterfeiting.

## **IQS NANOPTIQS**

Uses a revolutionary approach to create thin and miniaturized printed optics with unique features.

## **IQS NANO**

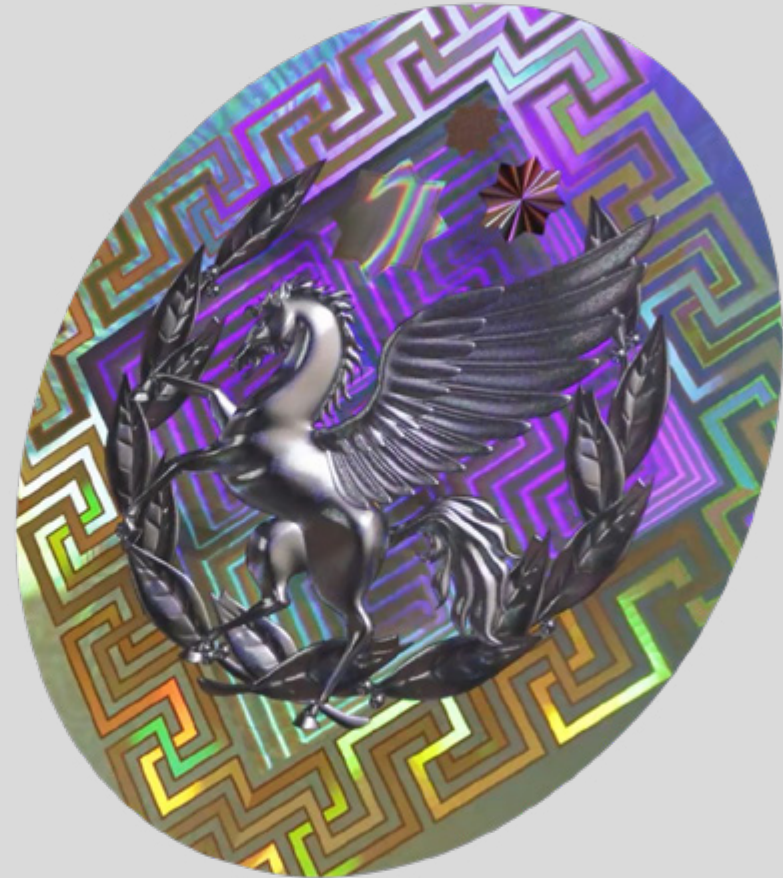
Focuses on the research and development of micro and nano components.

# IQ STRUCTURES

IQ Structures delivers new, innovative anti-counterfeiting solutions. Combining design and its own cutting-edge technologies, IQ Structures produces complex optical solutions that bring a new level of safety for banknotes, IDs, documents, goods, etc.



*Sophisticated algorithms for calculation of 3D surfaces*



# Mastering

We build and manage nanostructures to control light. We are equipped with technologies that allow us to record and build structures with a precision of several nanometres.

Our mastering technologies:

- electron-beam lithography,
- UV lithography,
- laser interferometry,
- our own 3D nano printer,
- and many others.

## **IDs and Passports**

IQ proID: holographic solution for the protection of polycarbonate IDs and passports

## **Banknotes**

Unique optical security features for the protection of paper and polymer banknotes

## **Documents, Valuables and Brand Protection**

Holographic protection of documents, security labels for the protection and authentication of goods, holograms embossed directly into metals, holographic microdots



find out more

# Stay ahead of the banknote counterfeiters

Unique optical security features  
for protection of paper  
and polymer banknotes

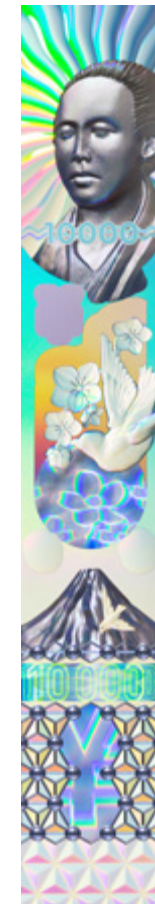


# Increase protection using breathtaking effects

**Unique optical security features have been developed to protect banknote stripes, patches as well as threads**

All graphical themes and elements used in banknote design may be converted into visually attractive holographic patterns. Combination of advanced origination technology and aesthetics driven approach provides the optical security features with easy and unambiguous authentication and extraordinary protection against counterfeiting.

- patches, stripes and threads
- paper, hybrid and polymer banknotes
- strong overt features for naked eye authentication (covert and forensic features available)
- unseen visual effects with gaming properties



# Unseen holographic effects

Make use of non-copyable, beautiful, and easily recognizable security features for your valuables.

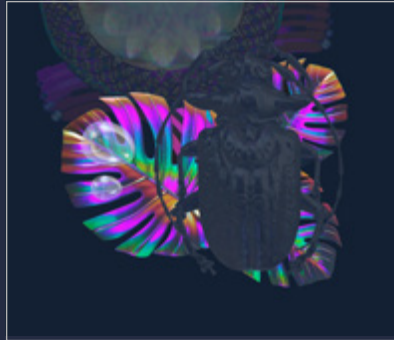
Combine any effects from our gallery, feel free to align them with your graphic designs



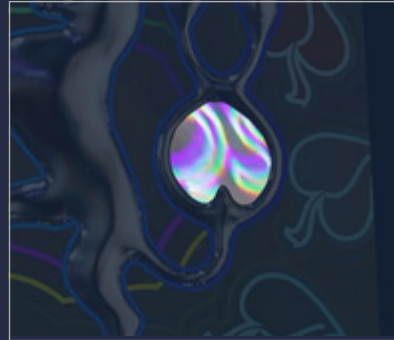




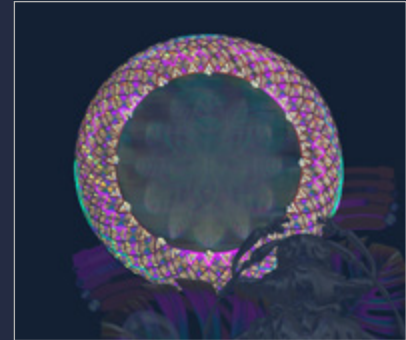
White 3D Bas-relief effect



Rainbow 3D Bas-relief effect



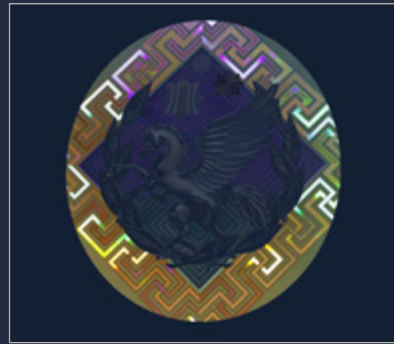
Keyhole effect



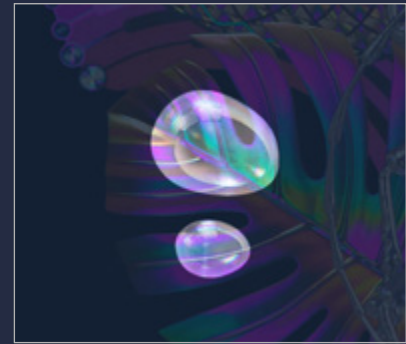
Modified Axicon effect



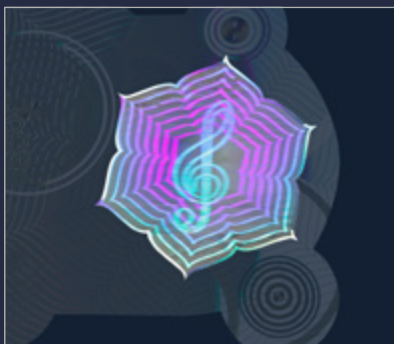
Moving effect



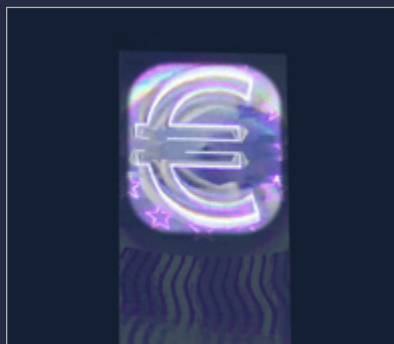
Kinetic effect



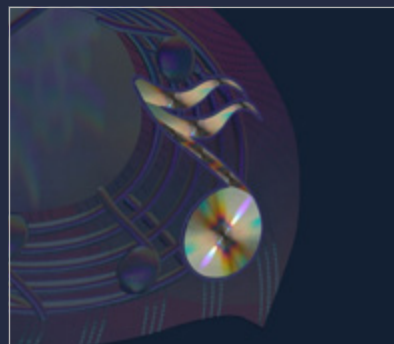
Semi-transparent White  
3D Bas-relief effect



Sharp 3D effect



Full 3D effect



Lens effect



[Find out more](#)

Document, valuables and brand protection.



Holographic solution for the protection of polycarbonate IDs and passports.



Holographic protection of investment gold.



Commemorative silver coin with embossed hologram of Škoda 498 locomotive.

Sophisticated holograms in harmony with printed elements and other security features (UV inks, OVI inks, tactile features, transparent windows).



# World award-winning solutions

Our products and solutions have repeatedly won international awards



IHMA Excellence in Holography 2018  
**BEST APPLIED DECORATIVE/  
 PACKAGING PRODUCT**  
 Armstrong and the trumpet



IHMA Excellence in Holography 2019  
**BEST ORIGATION  
 IQ Banknote Stripe**



Government Security Awards 2019  
**ANTI-COUNTERFEIT  
 PROTECTION**  
 IQ proID



IHMA Excellence in Holography 2022  
**BEST ORIGATION  
 IQ STRUCTURES**  
 IQS Singularity



Unique large area hologram on a vinyl record.

# IQS NANOPTIQS

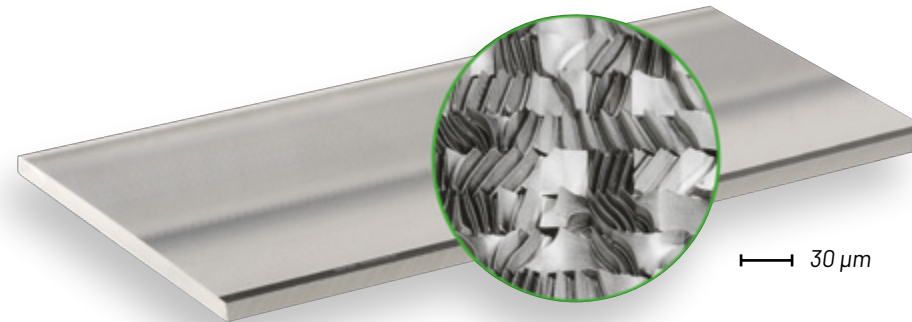
IQS NANOPTIQS uses a revolutionary approach to create thin and miniturized printed optics with unique features unattainable by traditional (extruded or moulded) production methods.

It produces standard lighting solutions or can work on a special project to meet the clients' expectations through its own research and development. With application potential in many areas, including LED lighting, galleries, showrooms and automotive lighting.



## IQ Linear Cutting-Edge Flat Optics

We found a way to supply luminaire manufacturers with the best-performing, affordable, single-element linear optics by using nanotechnology.



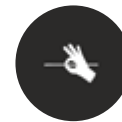
3D model showing a typical microrelief surface. The microrelief depth is exaggerated in order to clearly show the facets.

## IQ System Precision of Light Distribution

IQ System is a modular optical system integrating all optical functions essential for any luminaire. It gives the customer full control over the high definition light distribution and freedom in design.

## Custom Solution Discover Nanoptics Possibilities

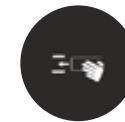
We enable luminaire manufacturers to produce products that bring joy and benefits to users. We develop and produce micro-optic elements enabling the full use of the potential of modern LED sources. We tread new paths and set trends in the industry.



**Slim  
Dimensions**



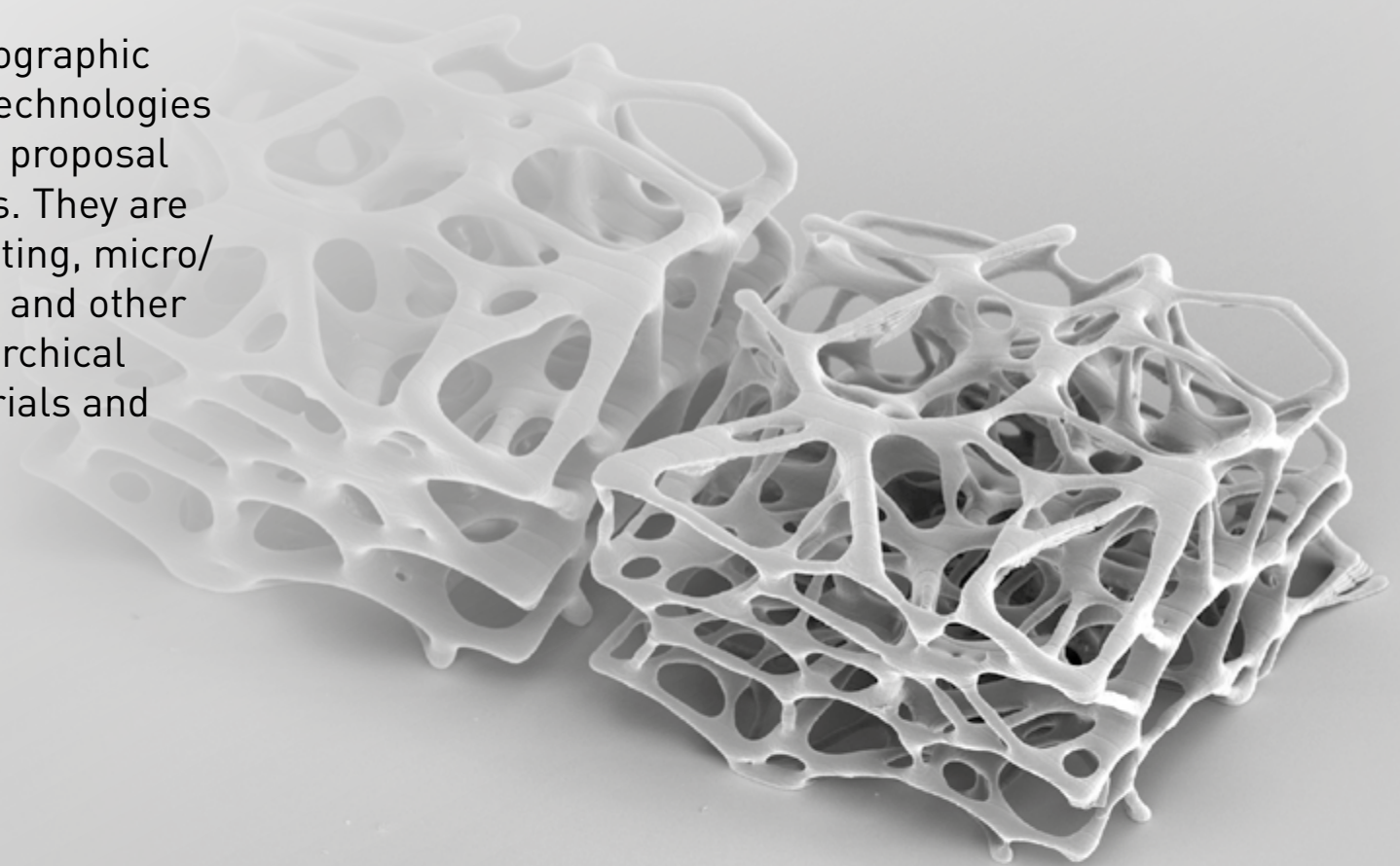
**Precise Light  
Management**



**Easy to  
Assemble**

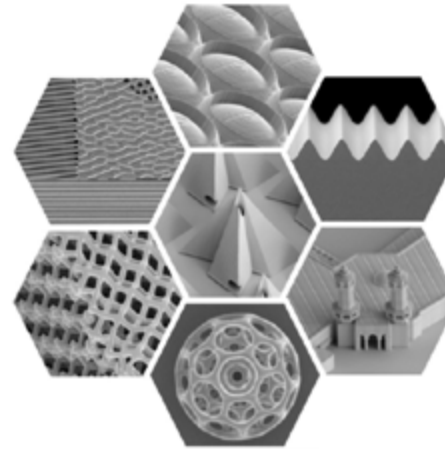
# IQS NANO

IQS nano develops lithographic and 3D nano printing technologies in conjunction with the proposal of relevant applications. They are used in anti-counterfeiting, micro/nanostructured optics, and other fields such as 3D hierarchical architected metamaterials and medical applications.



# Application

**IQS nano is a technology company focused on the development and production of optical and functional elements from micro and nanostructures.**



Our areas of interest include, in particular:

## DIFRACTIVE OPTICAL ELEMENTS

Include anti-counterfeiting holograms e.g., banknotes, IDs, LED lighting, laser beam shapers and multiplexers.

## BIOMEDICAL DEVICES

The application fields are pharmacy e.g., drug delivery; regenerative medicine e.g., 3D tissue/cell engineering; diagnostics and other life science applications.

## MICRO OPTICS

Development of technologies for recording micro-optical components for indoor/outdoor and automotive LED lighting applications.

## MEMS

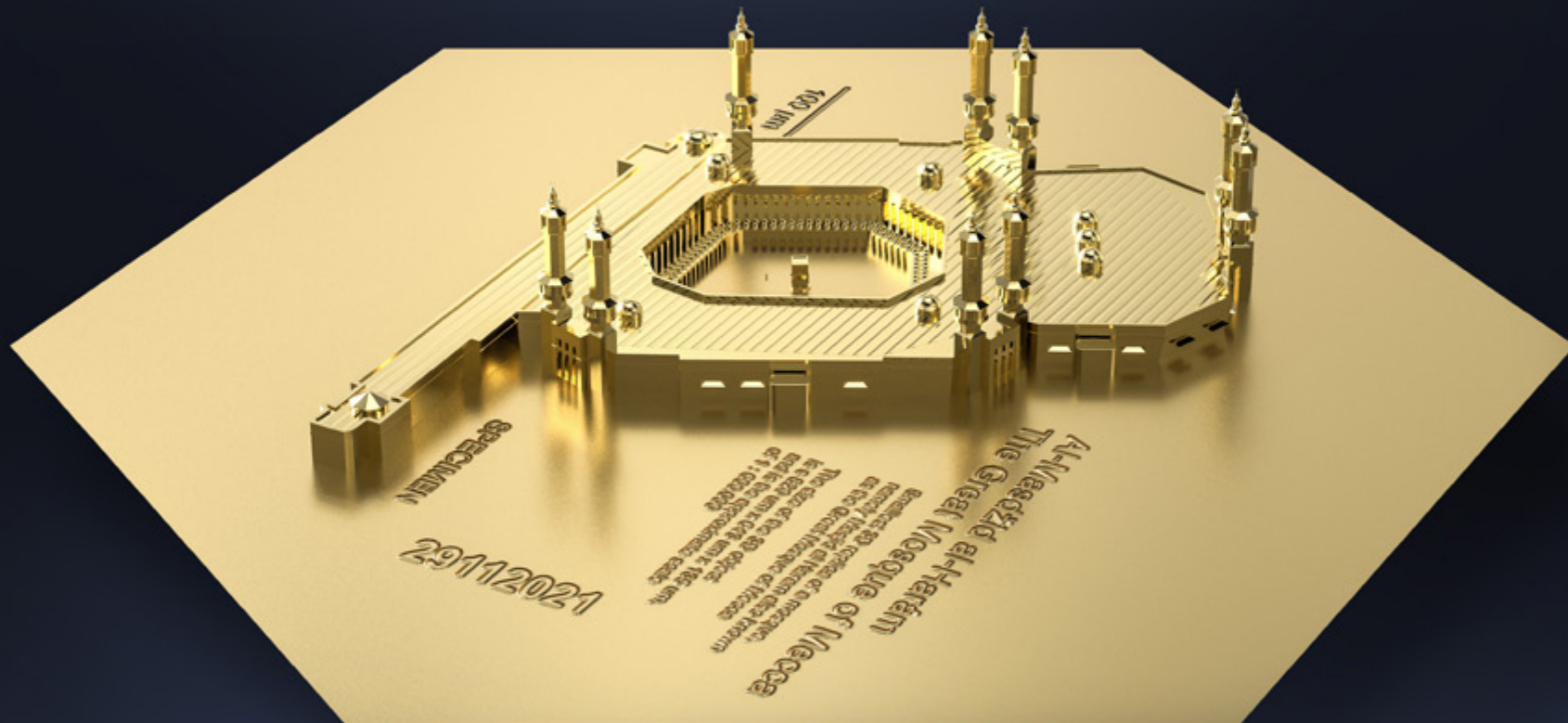
Solutions for Lab-On-Chip, microfluidic systems and mechanical metamaterials with 3D hierarchical architecture.

## 3D MICRO DEVICES

For recording miniature prototypes of components (e.g., microneedles, micro-containers), miniature art (e.g., Mecca exhibit) and other miniature 3D micro devices.

# Masjid al-Haram

IQS Group presents the smallest model of the largest mosque in the world – The Great Mosque of Mecca. The size of the 3D nano model is  $820\ \mu\text{m} \times 643\ \mu\text{m} \times 135\ \mu\text{m}$  which is the thickness of a sewing needle.



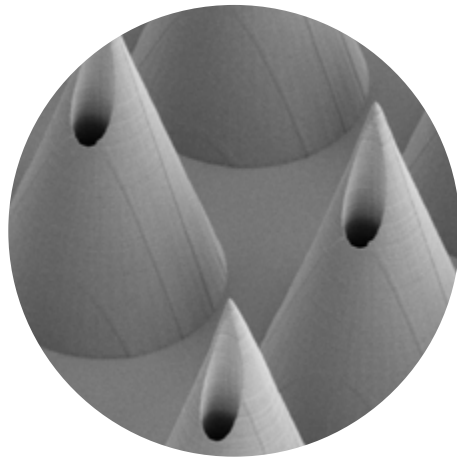
It was printed using microstereolithography with the resolution of 250 nm. It is in the approximate scale of 1:600,000 to real Masjid al-Haram. The model was created on a silicon wafer using 3D nano-printing based on two-photon lithography and is coated with an extremely thin layer of gold (100 nanometres).



# 3D tissue/cell engineering and controlled drug delivery

## Microneedles

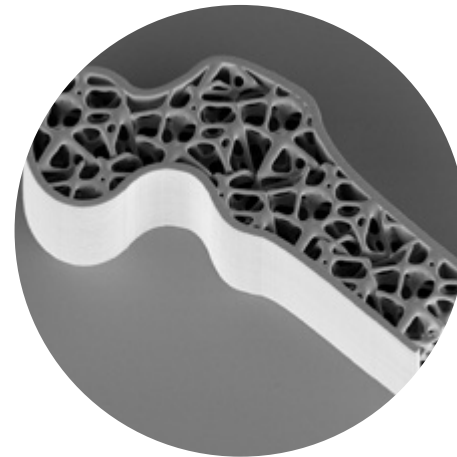
Imagine that in the near future, this technology will make it as easy to administer medicines to patients as it is to apply a plaster to a skin injury. The microneedles are so thin and short that they don't reach all the way to the nerve endings in the skin, and application should therefore be painless.



Size of one microneedle  
is approx 0.15 mm.

## 3D bio-scaffolds

3D bio-scaffold can be imagined as a porous material where the pore size is in the region of 0.1 mm. The internal structure of this material can for example mimic the porous structure inside bone, the internal structure of lung or liver tissue. If three-dimensional "scaffolding" like this is populated with cells which gradually multiply, they can eventually form a whole piece of tissue.



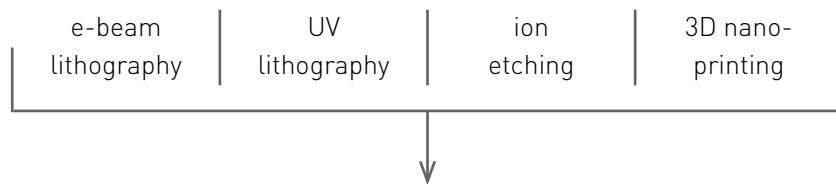
Size of the pore  
is approximately 0.1 mm.

# Powered by creative minds and 25+ years of experience

We have a unique mixture of technologies, custom-built equipment and top experts in their respective fields under one roof.

## Exclusive results using creative combination of cutting-edge technologies

Unique set of technologies allows us to create sophisticated nanostructures with extraordinary optical properties.



**Innovative optical features and extra safe security elements.**

## Expertise at all production levels

We cover all steps of the production process.



Security elements artwork



Holographic effects simulation and pre-processing calculations



Master production



Effective manufacturing

## Precision verified by own analytical instruments

The fact that we work at the nanoscale requires the use of special measuring devices to verify the proper function of our products.

# We share a passion for pushing technological boundaries

We enjoy confronting challenges in anti-counterfeiting protection. That is why we succeed in bringing new trends to the industry and why we are a key partner of the world's largest banks and document-issuing authorities.

## Quality and security certification

The Company is certified for the industrial standards ISO 14298, ISO 27001, ISO 14001 and ISO 9001.



Interested in technical details?  
Price quote? Lead times?  
Feel free to contact us



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