

silsef

Appearance modification by nano-patterning

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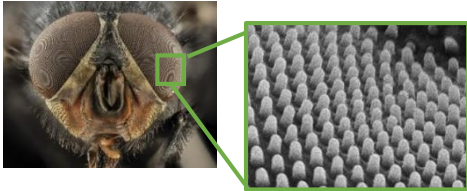
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GDR 2044 **APPAMAT**

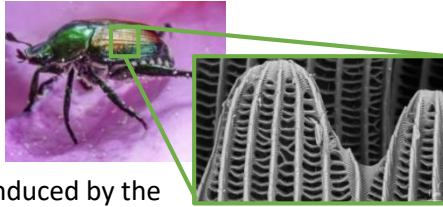
Attractive effects inspired by the nature...

Anti reflection effect of moth eyes



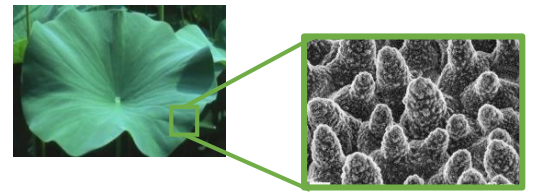
Change of effective surface **refractive index** thanks to high aspect ratio of the pattern

Iridescence and **coloration** effects



Induced by the periodic arrangement of **photonic crystals**

Local change of appearance by **water repellency**

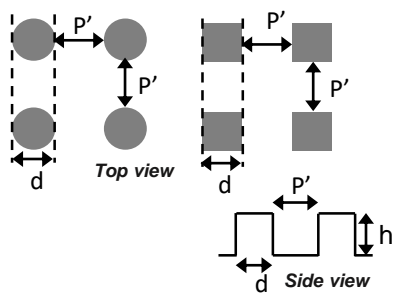


Superhydrophobicity in perfection: the outstanding properties of the lotus leaf, Hans J Ensikat, et al.

Double scale structuration (micro and nano)

... are mimicked in the laboratory ...

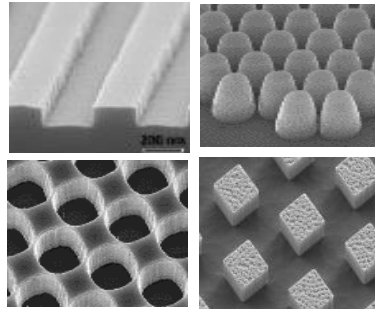
1 - Functional design



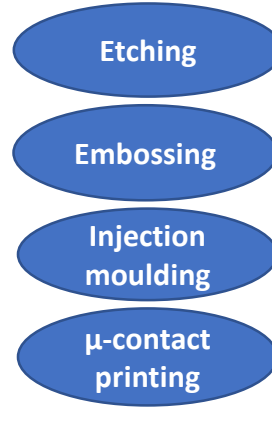
Design from simulation or experience
Large catalogue of patterns available

2 - Tools fabrication

Fabrication of micro-nano patterned tools: masks, stamps, injection molds,...



3 - Reproduction



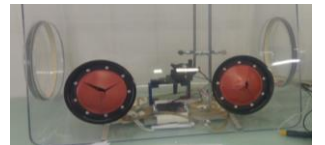
4 - Control

Topography: AFM, SEM
Optics: spectrophotometer
Wettability:

« ALPIN »
test bench



Fog/Frost:
« BCBG »



... to manufacture functional products on various materials



Anti reflection and contrast



Diffusive pattern preventing specular reflection



Local diffractive pattern leading to **high contrast effects** (marking applications)

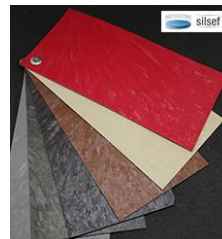


Coloration and decoration

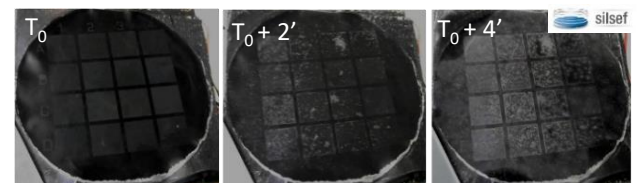


Coloration and shing from diffractive gratings

Decorative patterns on **leather or fabrics**



Hydrophobicity and anti-frost



Local **double texturation** to produce superhydrophobic and anti-frost effects



Study of the contact angle between different couple of liquids / materials

Nano-patterning on glass surfaces using SiO₂ sol-gel process:

- Flat surfaces or lenses
- From cm² up to m² dimensions
- Single side or **multiface** objects

Functionnal textures can be transferred onto **leather, fabric, polymers and metals** by:

- Hot embossing
- Injection molding
- Wet/dry etching

Options to use **resin, varnish, or sol-gel coatings** to change:

- Optics (refractive index, color,...)
- Mechanics (abrasion, strain,...)
- Adhesion on substrate

Numerous possibilities to create innovative surfaces and products

Conclusion & perspective

We propose **fast and cost-effective processes** to engineer the appearance of various materials by nano and micro scale patterning.

Such processes are applicable to surfaces up to m² dimensions, so they can lead to the **large-scale / volume production** or either to realize **model surfaces** for fundamental studies.

Acknowledgements

We would like to acknowledge the financial support of ANR (projects "SINCRONE", "SPOT", ASTRID "OPERA") and DGA ("BISONS")

