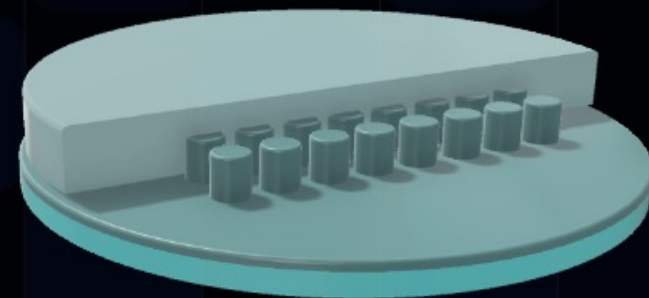




AIR-COAT

Cladding layer for photonic
meta-surfaces & PICs





SOLNIL



marco.abbarchi@solnil.com

CSO at SOLNIL and Associate Prof. at Aix Marseille University



Pépinière d'entreprises Luminy Biotech, 163 avenue de Luminy,
13011 Marseille France



www.solnil.com





TECHNOLOGY & PRODUCTS

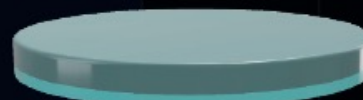


Inorganic resins

Liquid deposition

Liquid deposition +
Nano-imprint

Liquid deposition
on metasurface



2D Coating



3D metasurfaces



Cladding layer

Our difference :
materials with
extreme
properties

Our advantages :
Lower CapEx &
CoO, Greener
process



OPTICAL PROPERTIES OF AIR-COAT

AIR-COAT is a new generation of **inorganic** nanostructured material, bridging dense and porous optical layers.

AIR-COAT is composed of 70% void and 30% SiO₂. It almost matches the refractive index of air, in a **transparent**, **robust**, and **process-compatible** form.

RI@520nm = 1.12 +/- 0.005

Absorption < 0.03 % VIS

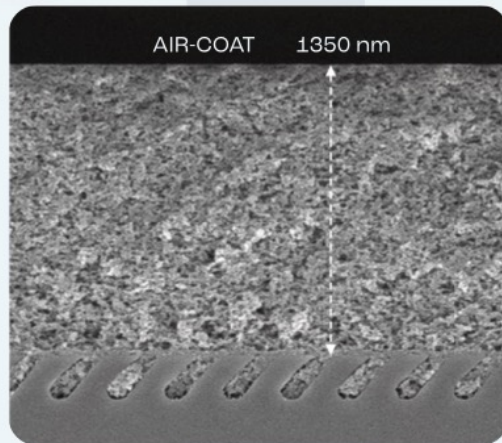
HAZE < 0.1 % (ASTM D1003)



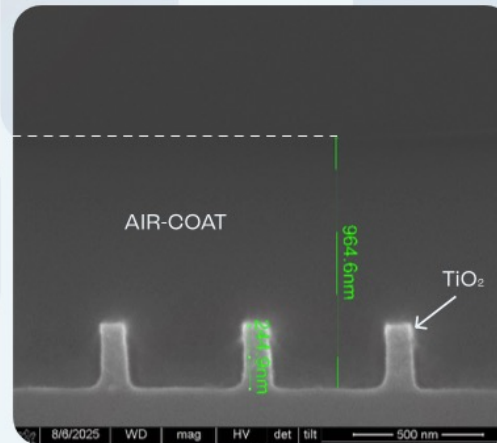


ENCAPSULATION OF META-SURFACES WITH AIR-COAT

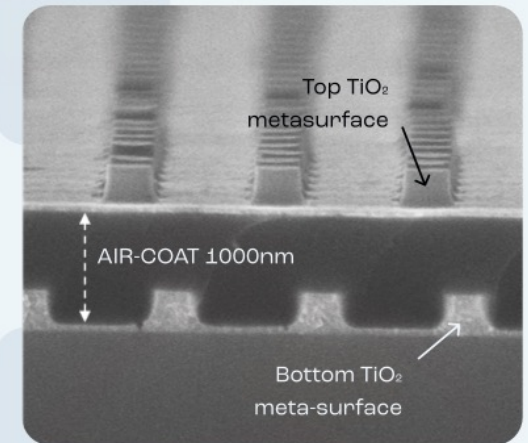
- FILLING OF NANO CAVITIES
- NEGLIGIBLE RIPPLE
- META-SURFACE STACKING



Cladding for
slanted gratings



Cladding for
meta-surfaces

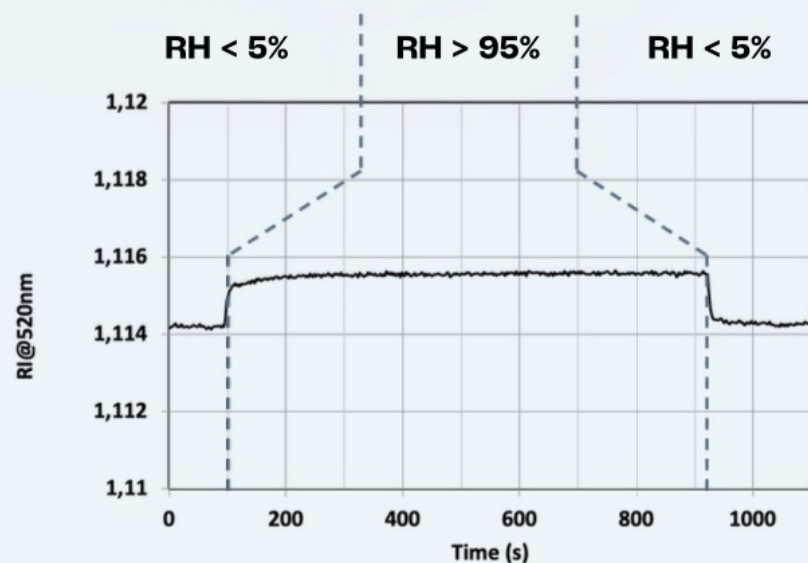


Vertical stacking of
meta-surfaces



STABILITY AND DURABILITY OF AIR-COAT

Measurements on 2000 nm thick **AIR-COAT**
Refractive index vs relative humidity (RH)

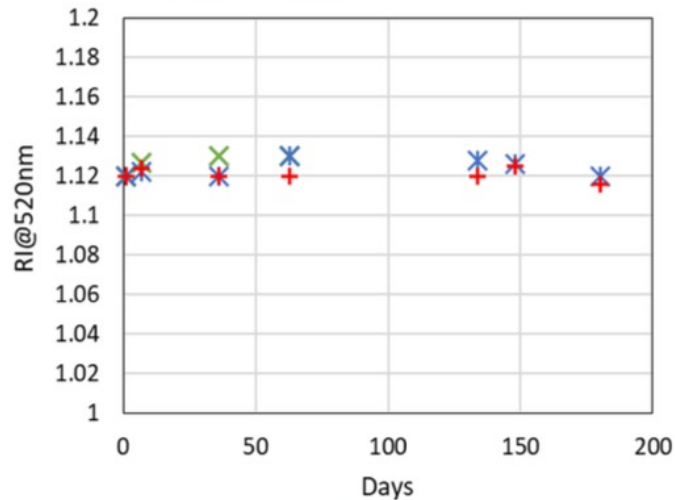


- **THERMAL CHOCK**
>100 cycles -30°C / 60°C
- **HUMIDITY RESISTANT**
> 72h at 85°C and RH = 85%
- **WATER REPELLENCE**
< 0.002 RUI from 5 to 95% RH
- **UV RESISTANT**
> 1h 306 W/cm² @ 365 nm
- **ADHESION**
tape peeling resistance (ISO-2409)
- **LASER DICING**
sharp cut with no delamination
- **CHEMICAL RESISTANCE**
conventional acids and solvents



AIR-COAT RESIN LIFE-POT

- HIGH STABILITY UPON TIME (> 6 months at -18 °C)
- FIXED PROCESSING CONDITIONS WITH TIME
- EASY STORAGE AT 4 °C



Storage temperature (°C)	Air-coat pot life
- 18	> 6 months
4	3 months
25	1 month
60	4 days

Pot-life vs storage temperature



THANK YOU

CONTACT US FOR FURTHER INFORMATION

dominique.bonisseau@solnil.com

marco.abbarchi@solnil.com

www.solnil.com
