



EXOCOAT
by Axcentive

Smart and Functional Coatings RAMSPEC

Introducing EXOCOAT Technology and Applications

20 minutes only



Who we are: Axcentive

- SME from Management buy out
- Supplier of specialty products to the inks, coatings and laminates markets
- Since 6 years strong developments smart coatings
- Product/chemical engineers
- General focus on formulators' market with triangle cooperation with OEM requests
- Globally present
 - Head Office in Marseille
 - Local Office in Singapore



Technology and Applications to Highlight Today

- Sol-Gel-Technology
- Non-Stick polymer Technology
- Sol-Gel based Nano Titanium Oxide



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Sol-Gel-Technology

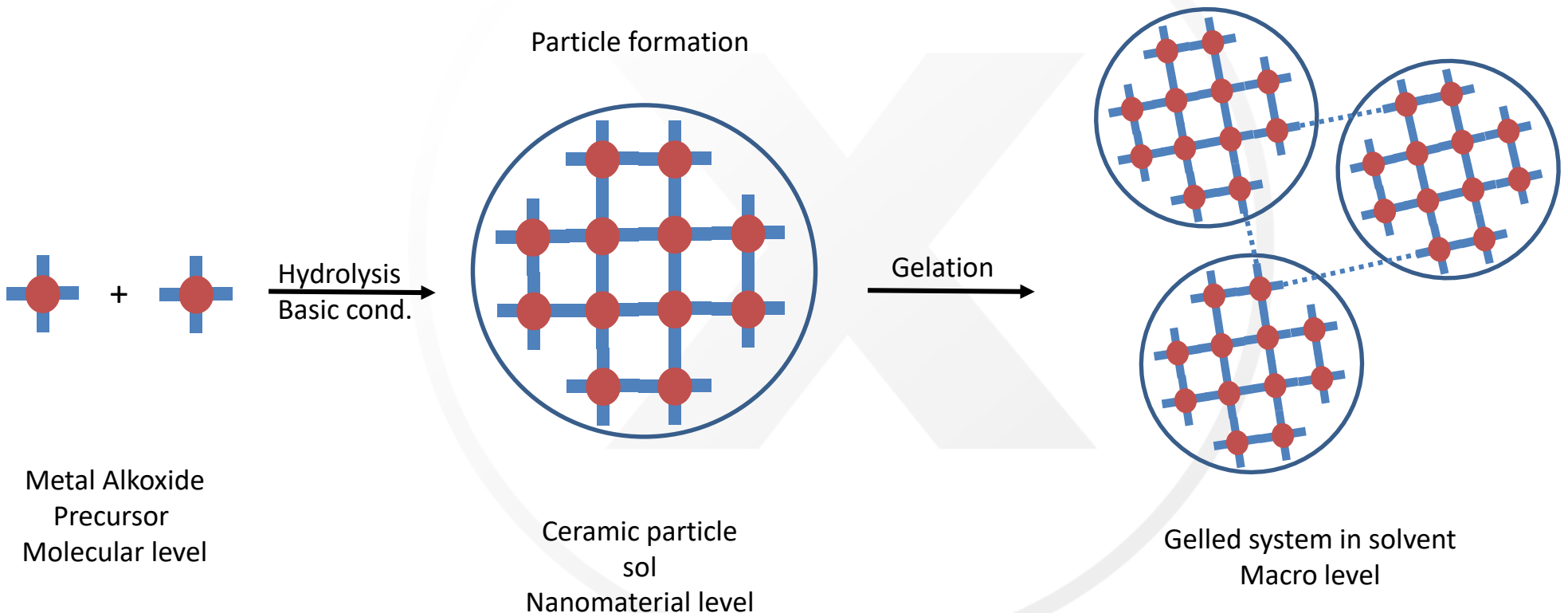


Sol-Gel-Technology

- Powerful way to make ceramic materials
 - Traditionally @ elevated temperatures
 - Recently also @ ambient temperatures
- While being ceramic = very hard, sol-gel can still be formed in any complex shape
- Sol-gels may be built from a variety of raw materials

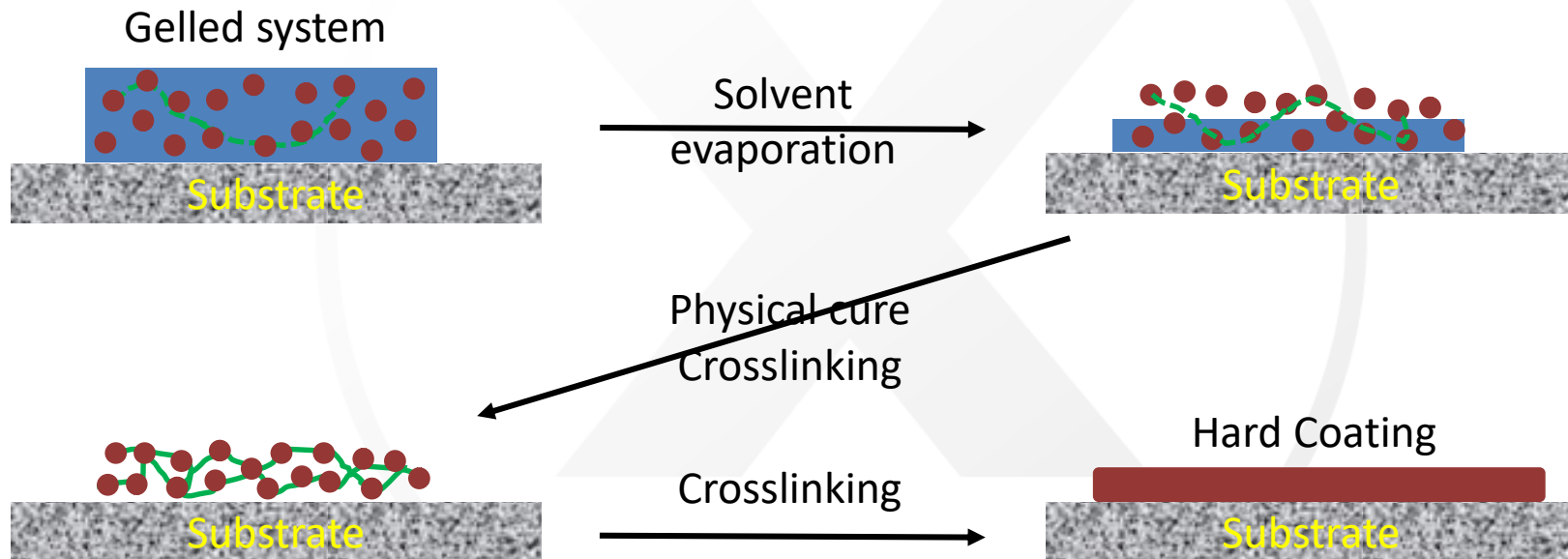


Sol-Gel: From Precursor to Sol to Gel





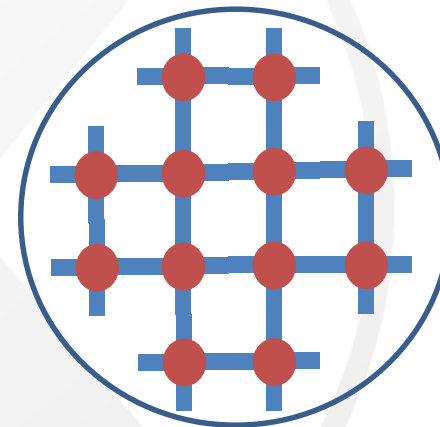
Sol-Gel to Coating





Particles modification

- Controlling parameters
 - Physically: Particle size and shape
 - Chemical modification

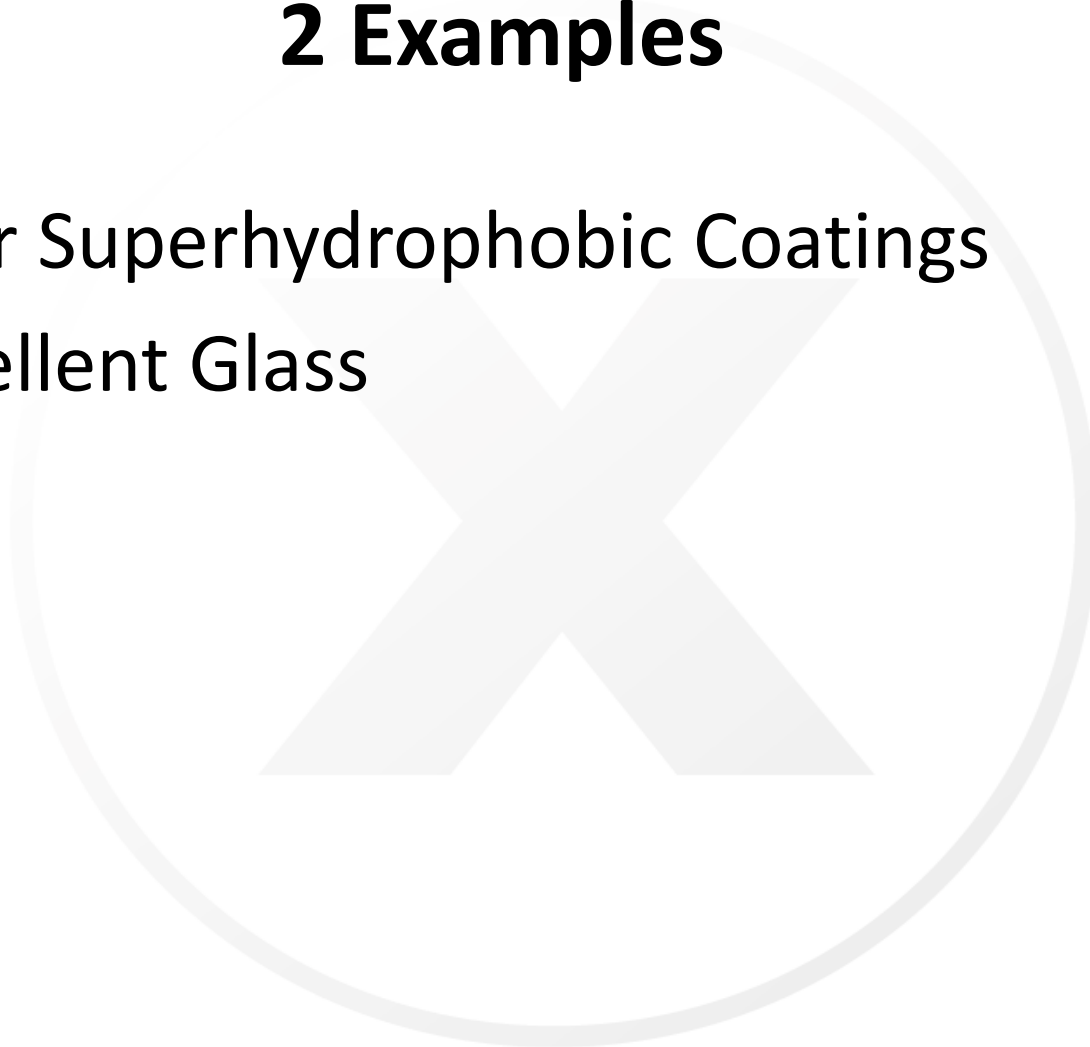


Ceramic particle
Particle size: 30-1000nm



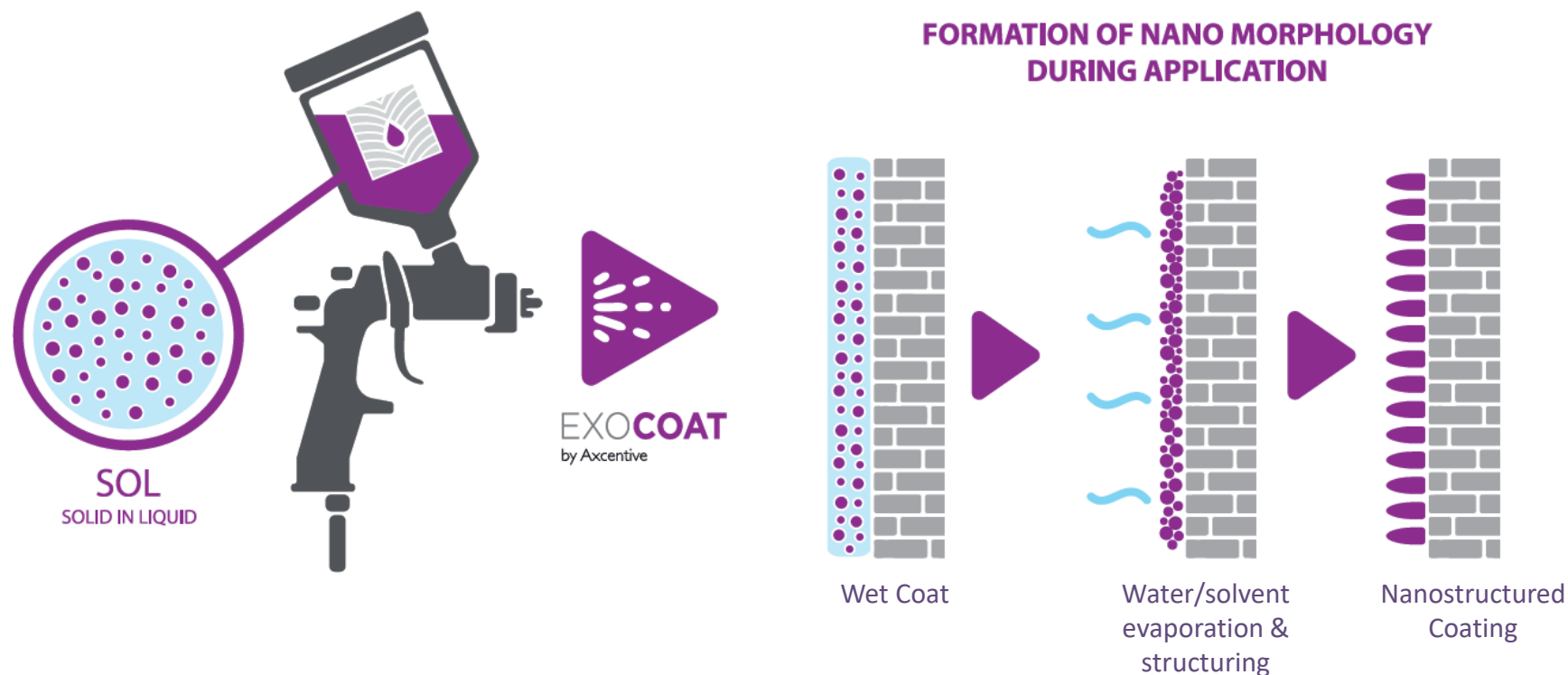
2 Examples

- Spheres for Superhydrophobic Coatings
- Water repellent Glass





Spheres for Superhydrophobic Coatings

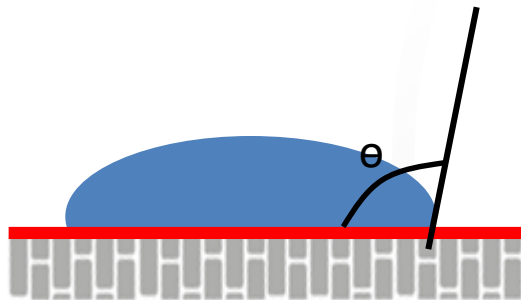


- Particle size typically large to create nanostructure



Why do we need Nanostructured Coatings

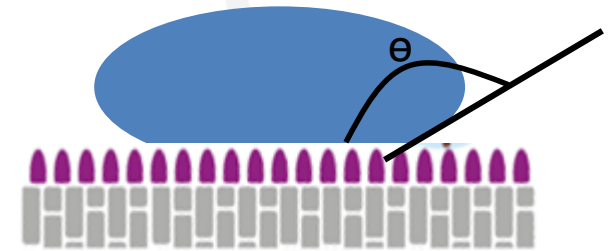
- Young's state
- Flat surfaces



$$\theta = \max 115-120^\circ$$

- 100% dependent on chemistry
 - Fluoro chemistry
 - Silicon chemistry

- Cassie-Baxter state
- Structured surfaces



$$\theta = \max 180^\circ \text{ (theoretical)}$$
$$\theta > 140^\circ \text{ Superhydrophobic}$$

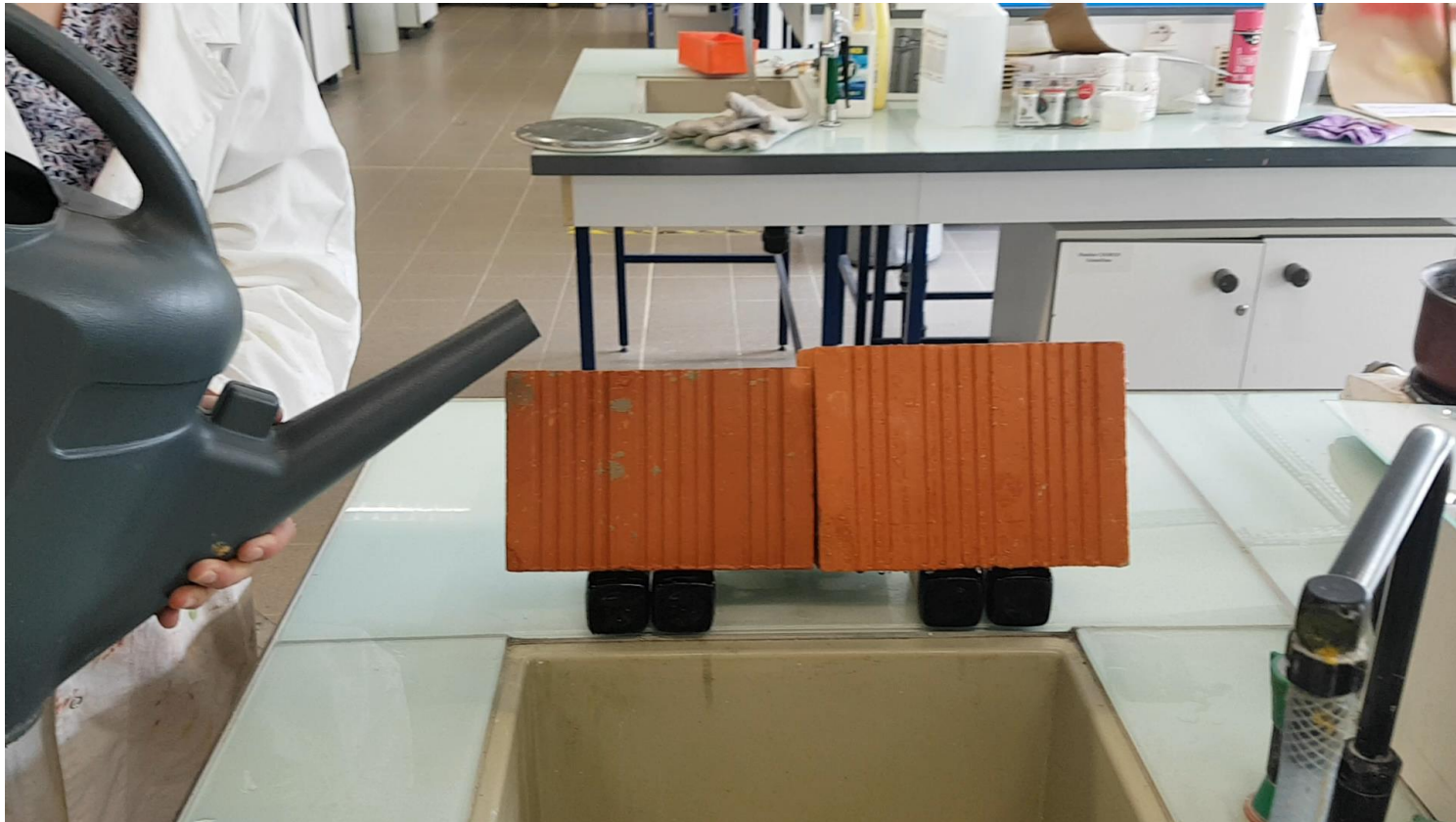
- Structure amplifies the hydrophobicity of an already hydrophobic surface



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EXOcoat SH on brickwork

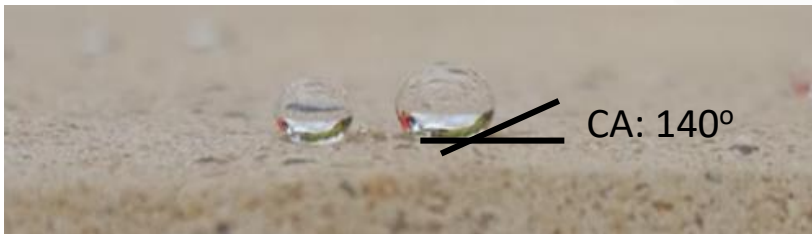




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EXOCOAT SH for Superhydrophobic Coatings



- Application:
 - Brick work
 - Stone building
 - Historical buildings
 - Neat wood

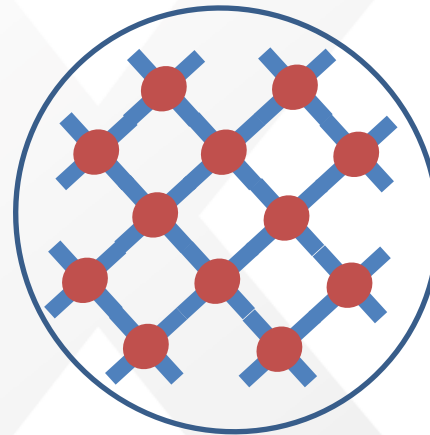




Ex. 2: Sol-Gel for Glass: EXOCOAT Clearview

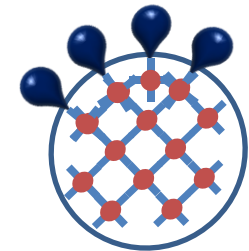
- Controlling parameters
 - Particle size and shape
 - Chemical modification

Mineral substrates



Mineral substrates: Bigger particles

Glass



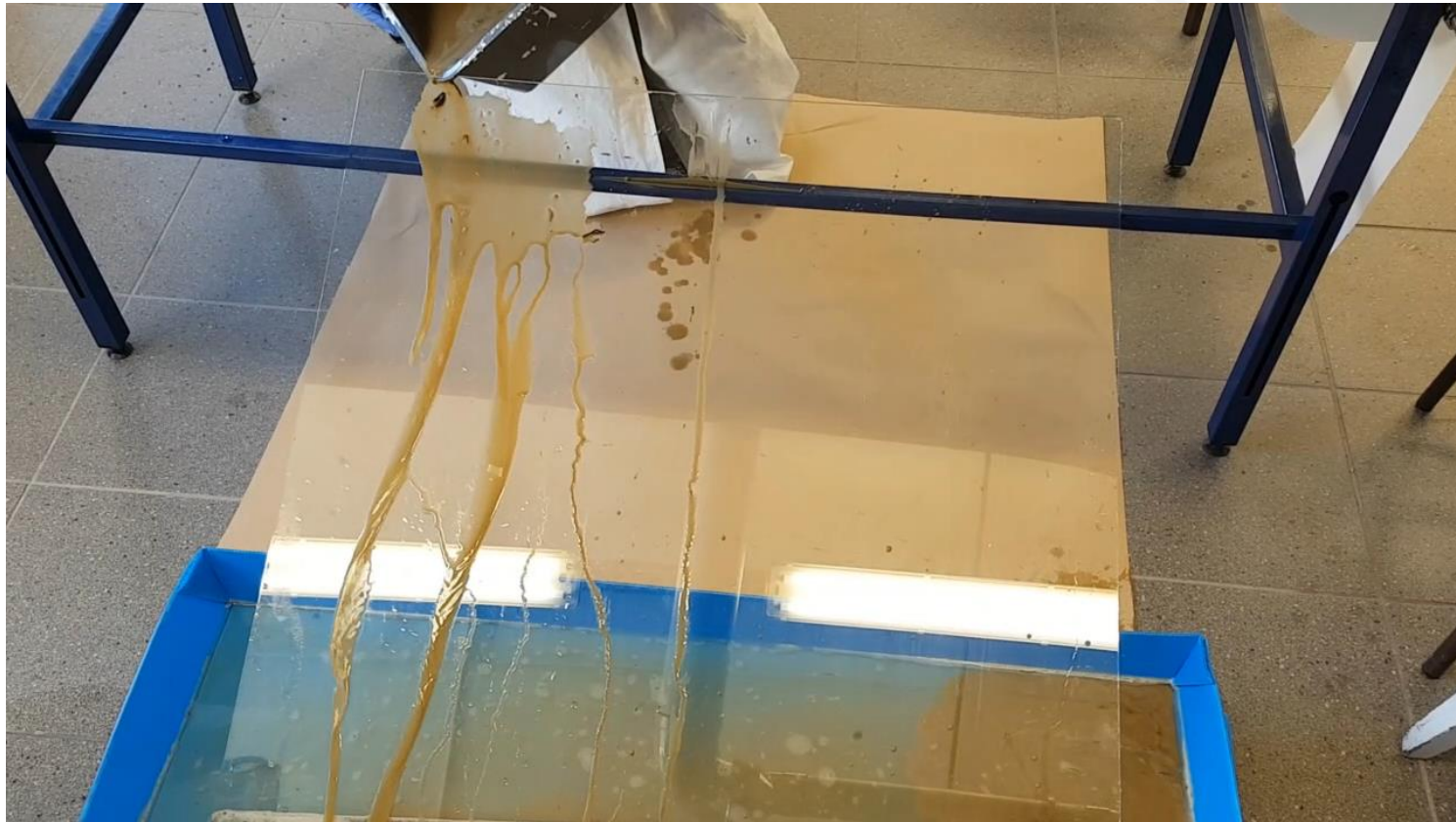
Transparency: Smaller particles
E2C: Oleophobic modification



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EXO COAT Clearview: Hydrophobic Glass



Other Application Sol-Gel-Technology

- Hybrid Sol-Gel for Anticorrosion
- Water resistant conformal coating for PCB



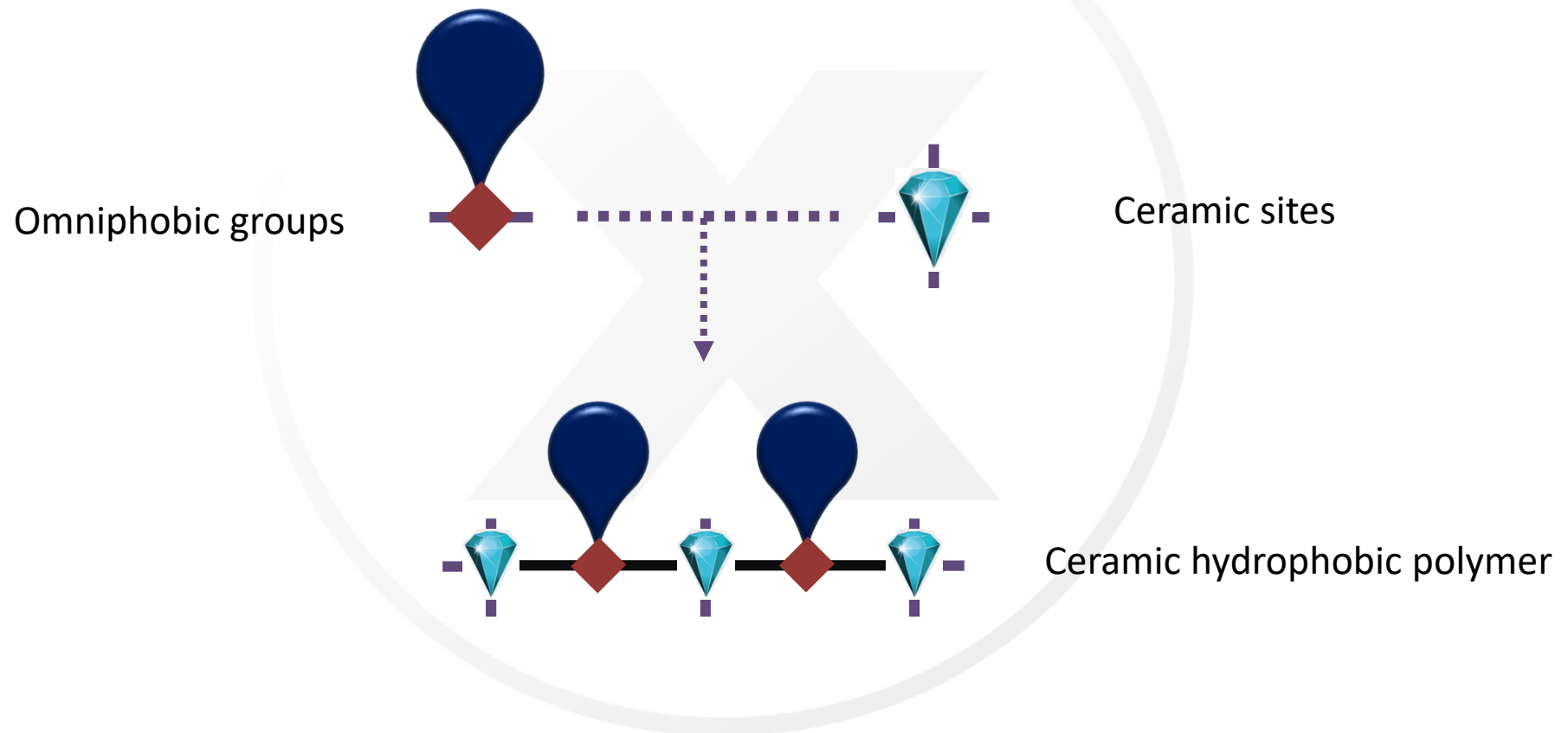


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Non-stick polymer Technology



Non-Stick Polymer Technology

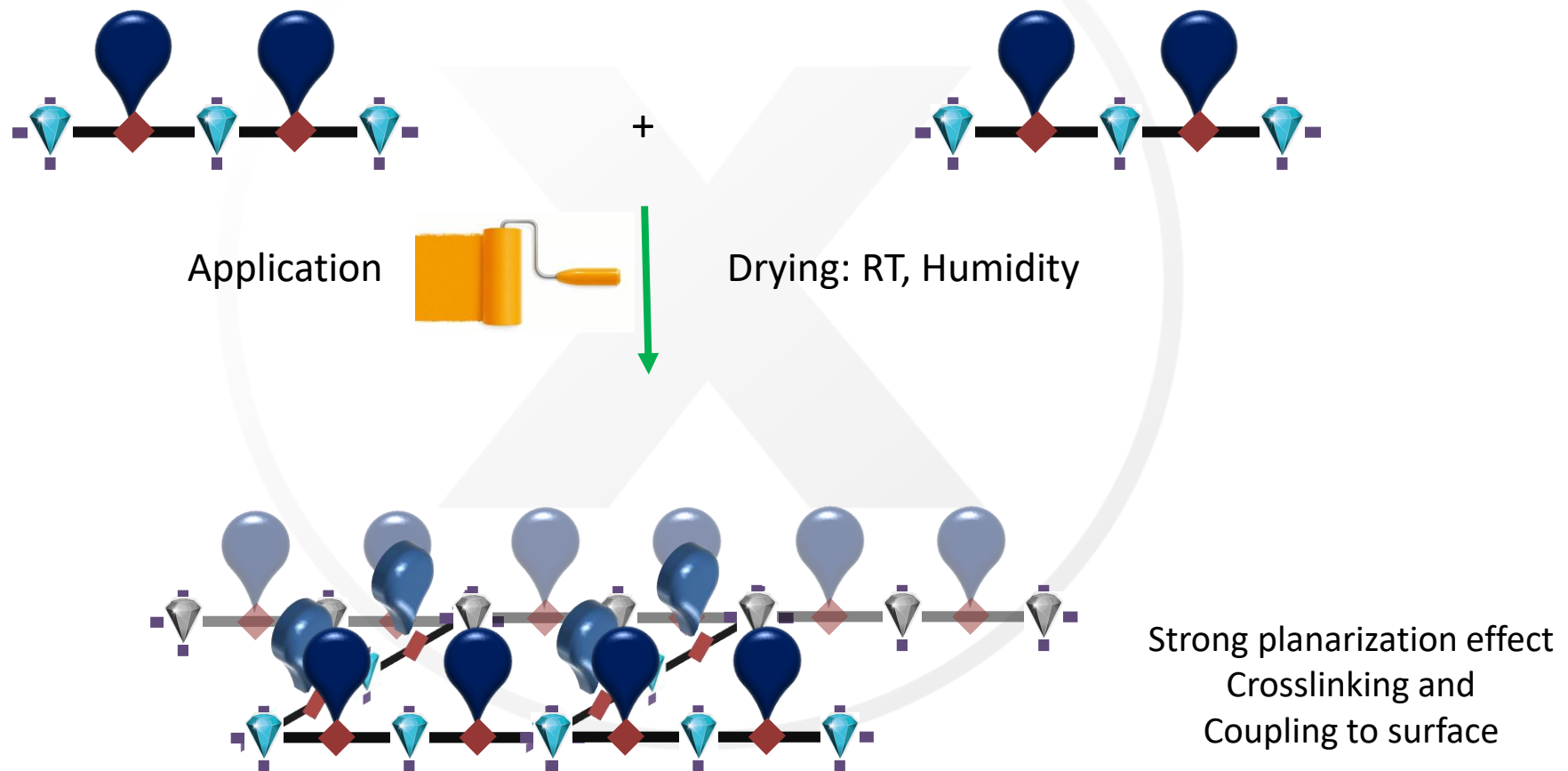




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Crosslinking to build strong coating





Non Stick Polymer: EXOCOAT 143

- 1K moist cure system
- Super smooth, planarized
- High crosslink density
- Low surface energy: 20 dyne/cm
- Hydrophobicity, CA to Water: 120°
- Oleophobicity, CA to HD: 60°
- 100% Adhesion to metal, glass, plastics (ISO2409: 0)



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2 Examples: EXOCOAT 143

- Anti Graffiti Non Stick Topcoat
- Easy to clean DTM coatings



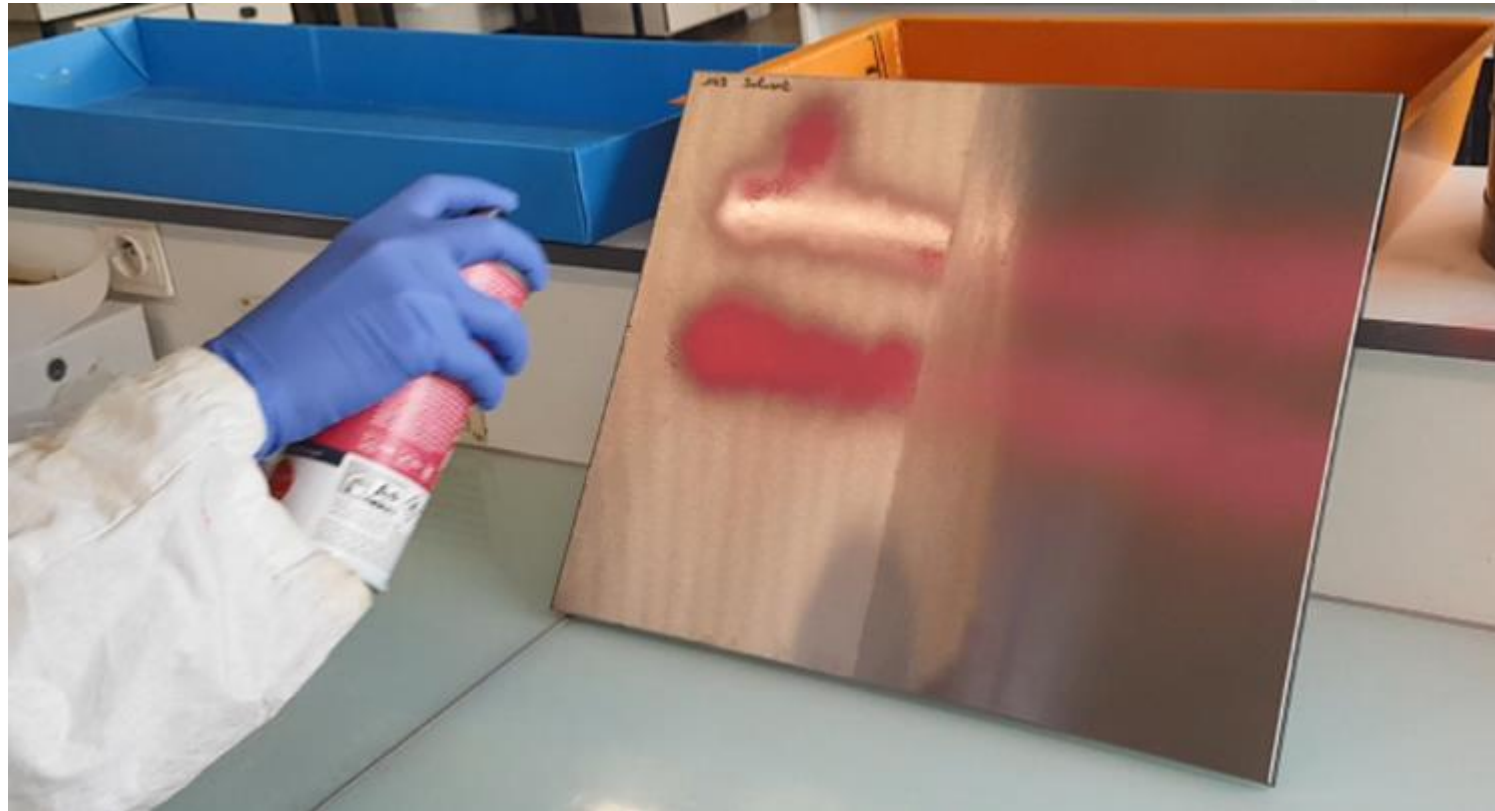


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Anti-Graffiti (SB)

Noncoated Coated EXOCOAT 143





Anti-Graffiti

- Wiping down after cure

Noncoated

Coated 143

Direct

After curing





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EXOCOAT 143 DTM Aluminium (bare)

- 1000hrs Salt Spray while keeping Easy to Clean property





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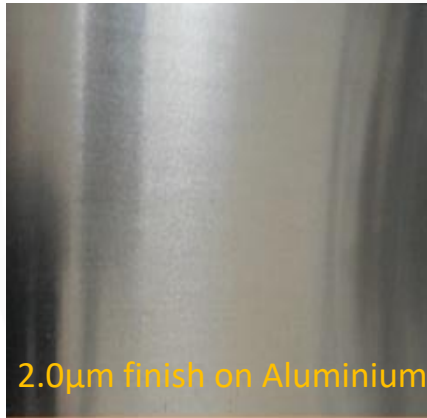


Non Stick Polymer: EXOCOAT 143

- Applications



Easy-to Clean



Thin coating Aluminium



Anti-Graffiti Walls



Anti-Fingerprint
dashboards



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Photocatalytic Nano Sols



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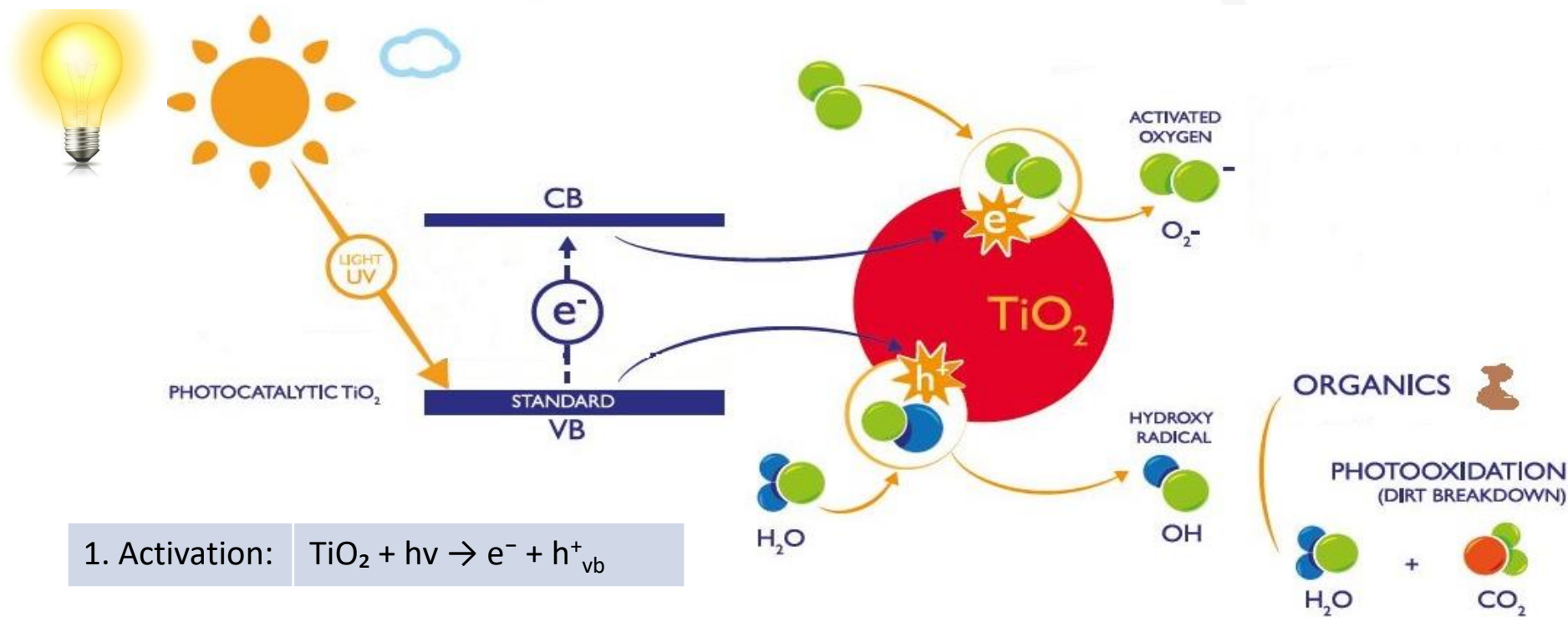
2 Functions: Photocatalytic Nano Sols

EXOcoat 151

- Indoor: Breakdown organic matter
- Outdoor: Wash off effect

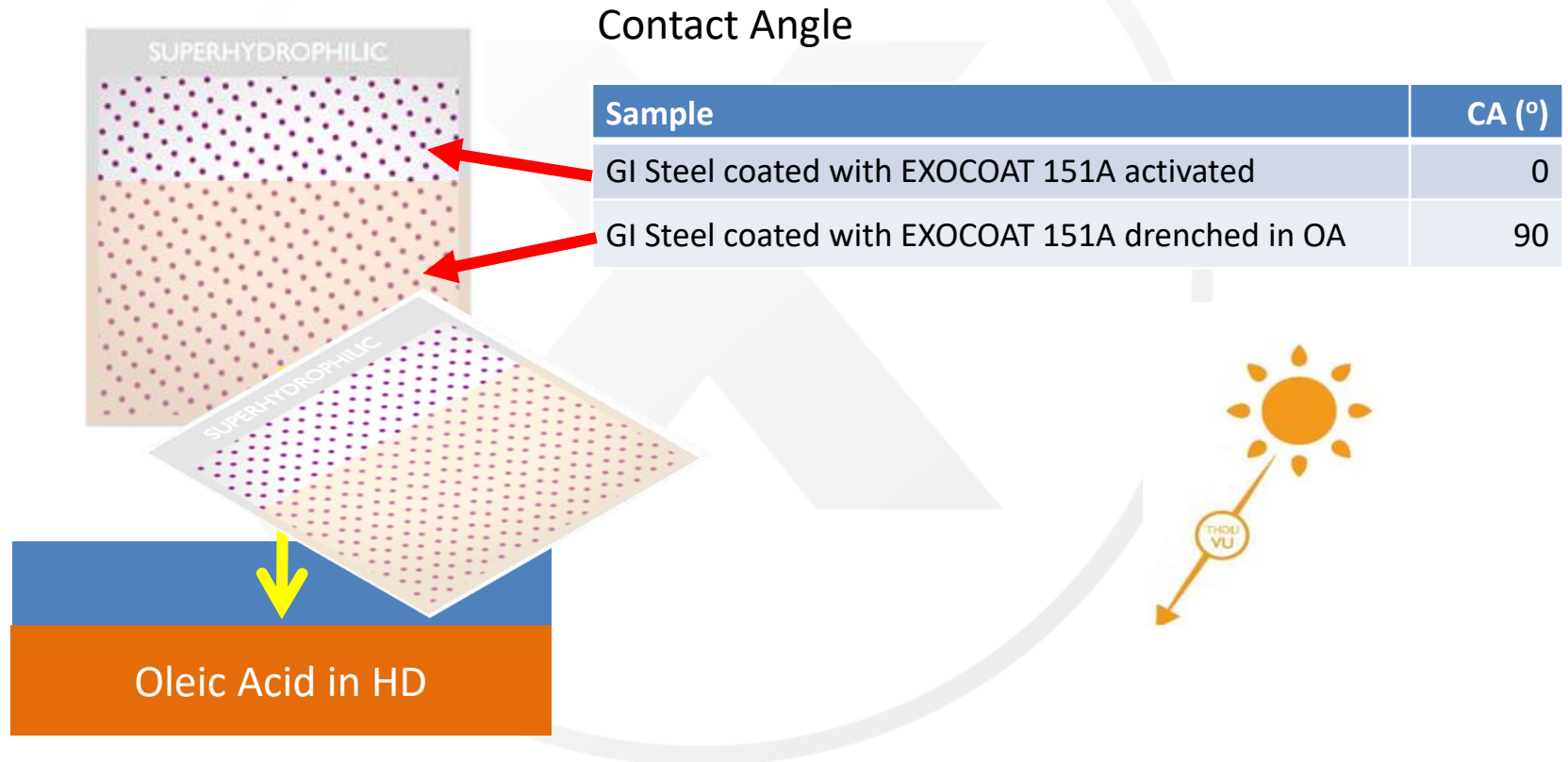


Photocatalytic Breakdown of Organic Matter with Nano sol





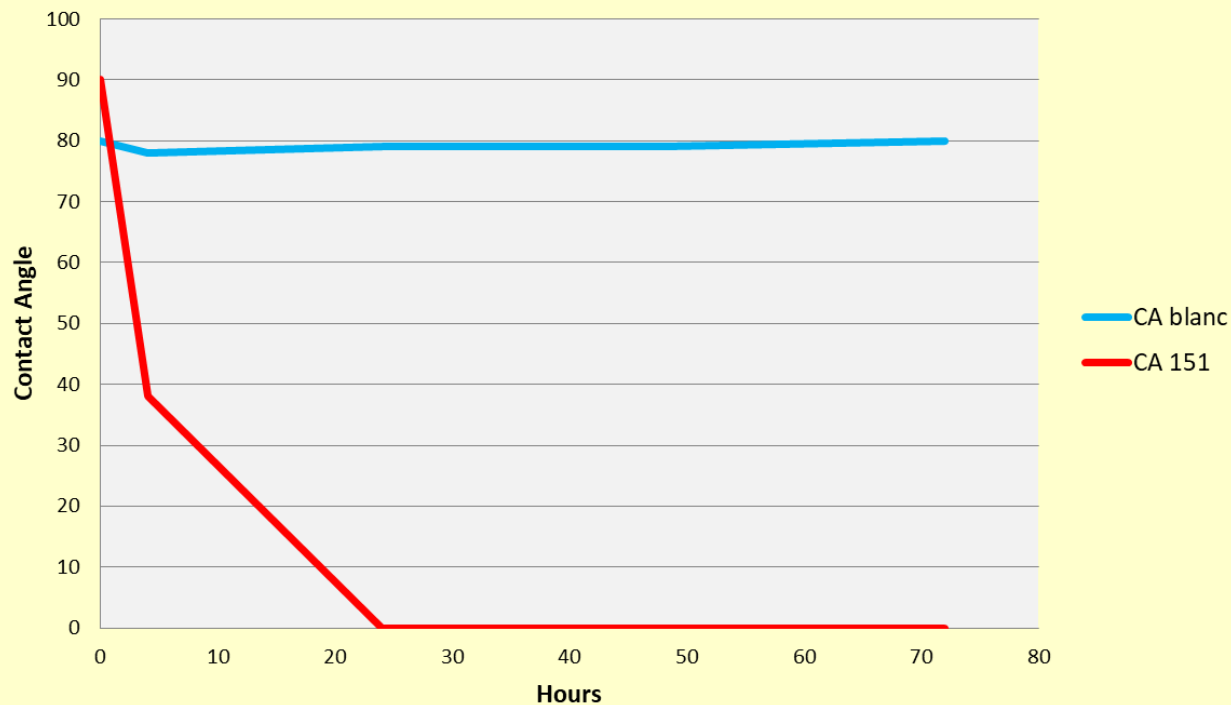
EXO COAT 151: Breakdown of Organics & Fats





E. 151: Breakdown of Organics & Fats

ISO27448- CA decrease of Oleic acid by EXOCOAT 151A



Oleic acid (C_{16-18})COOH

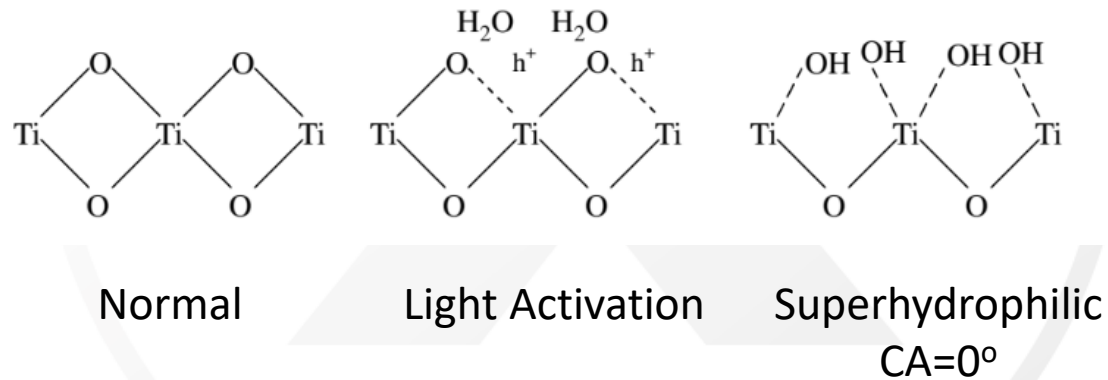
$h\nu$, TiO_2

$H_2O + CO_2$



EXOCOAT 151: Washing effect/water sheeting

- Superhydrophilicity created by:
 - Splitting the Ti-O-Ti to form TiOH

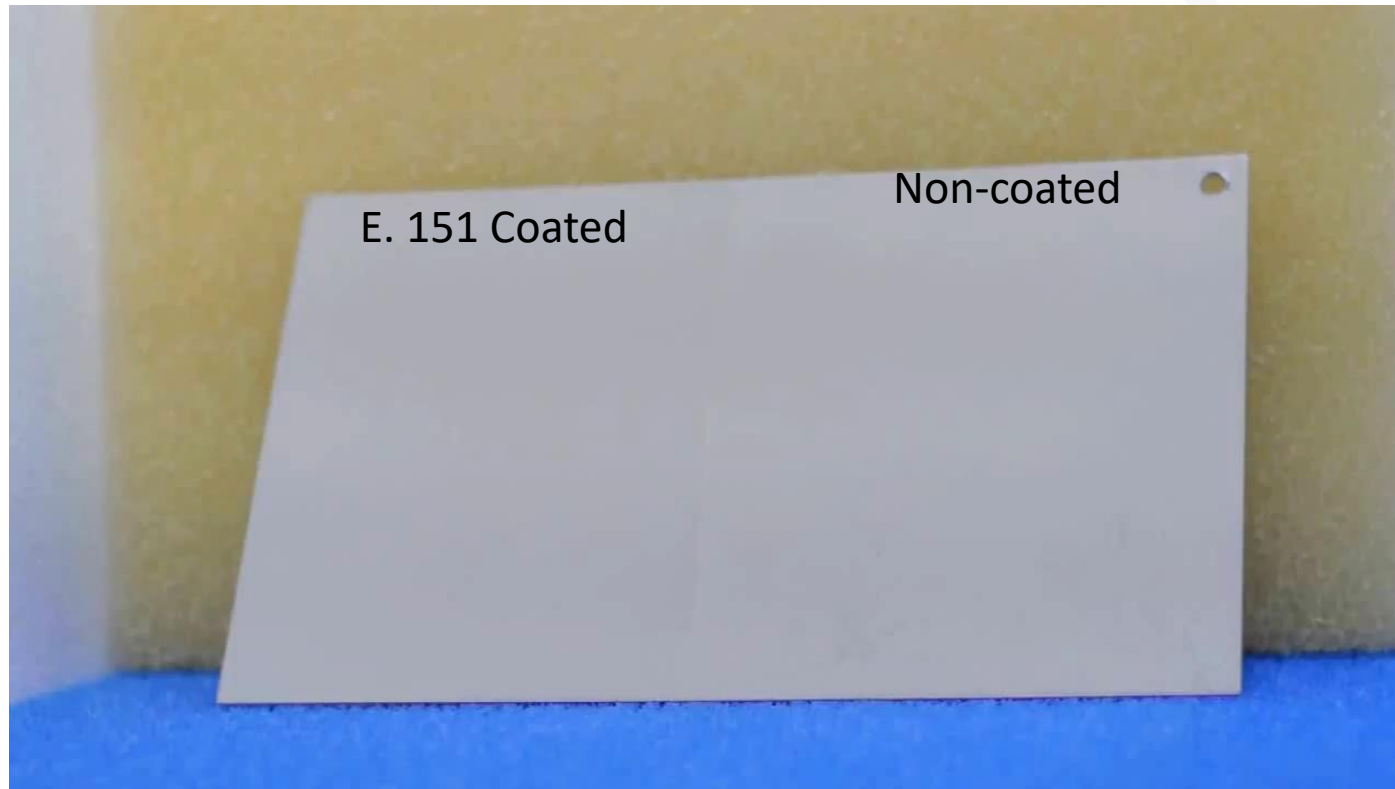




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EXOCOAT 151: Washing effect/water sheeting





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EXO COAT 151: Outdoor Performance



Non-coated, Cleaned
After 3 months



Coated with Nano Titanium Oxide
& Cleaned



Coated with Nano Titanium Oxide
After 12 months



EXOCOAT 151

- Important (side) effects of Nano Titanium Oxide next to Self-Cleaning
 - Anti-microbial/fungal
 - Odour neutralizing
 - Depolluting
 - Anti-static
 - Anti-fogging



Summary

- Exocoat Technology available to formulators
- Sol-gel-technology is very modifiable for many applications
- Durable Non Stick polymer
 - Anti-graffiti
 - Easy to clean DTM coatings
- Photocatalytic Sols: Self-cleaning and Organic eradication



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More information

Interested in our product proposal or in need of more information please contact us

Europe, Americas, Middle East
and Africa

Axcentive SARL

Chemin de Champouse

13320 Bouc Bel Air, France

+33 4 42 69 40 90

info@axcentive.com

www.axcentive.com

Asia, India and Australasia

Axcentive Asia Pte Ltd

13 Lorong 8 Toa Payoh,

#07-01 Braddell Tech Park

319261 Singapore

+65 6258 6338

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