

Glass Meets Textiles

The Functionalization of Textiles by Magnetron Sputtering
and Plasma Enhanced Chemical Vapor Deposition



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AGC

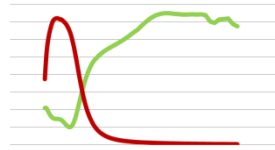

**Plasma
Technology
Solutions**

Glass industry: Mass customization based on realistic rendering - coating on demand



Coating definition

Intercoat
dielectric 3
barrier
Ag
underlayer
dielectric 2
barrier
Ag
underlayer
dielectric 1
barrier
Glass



STEP 1:
Color
selection

STEP 2:
Coating customization
(optimization + rendering)

STEP 3:
Coating
definition

Lunch

STEP 4:
Prototype

STEP 5:
Production

9 AM



Realistic rendering

12 AM



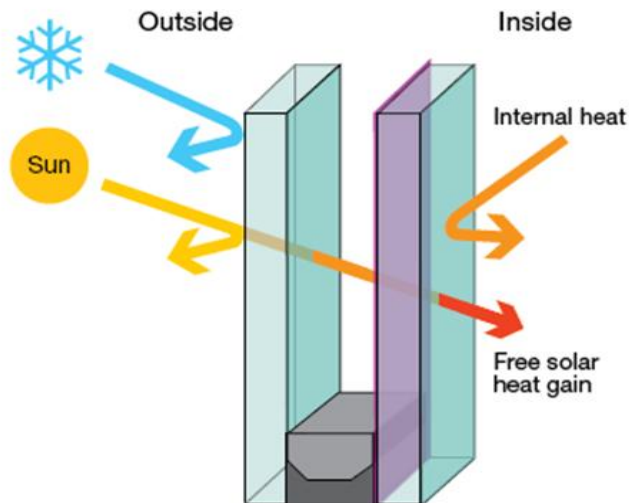
5 PM



VISTA TOWER, CHICAGO, USA

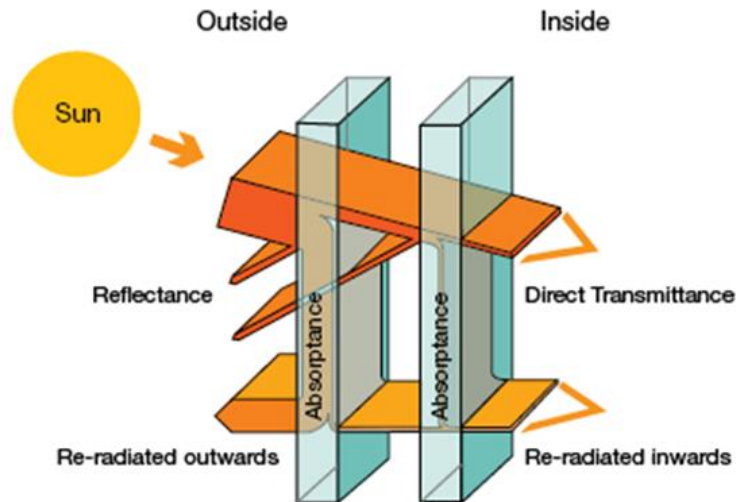
Glass industry: Energy efficiency of building and cars

Insulating glass



**Reduce
heating need**

Solar control glass



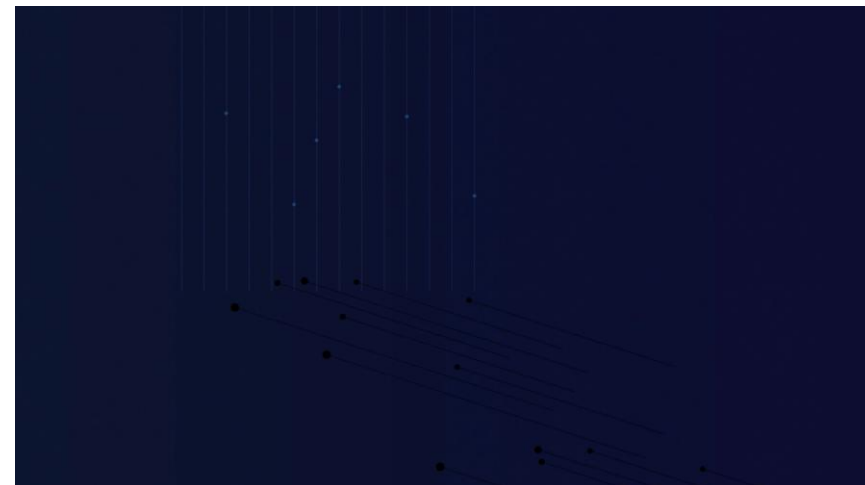
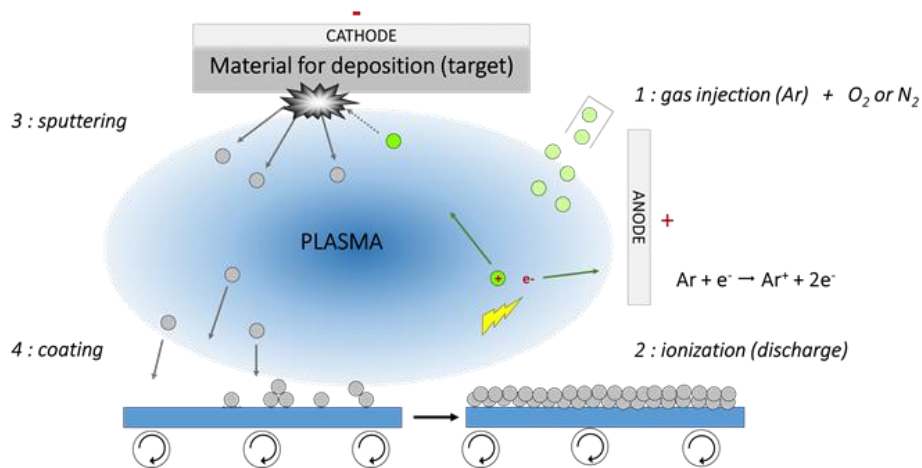
**Reduce air
conditioning need**



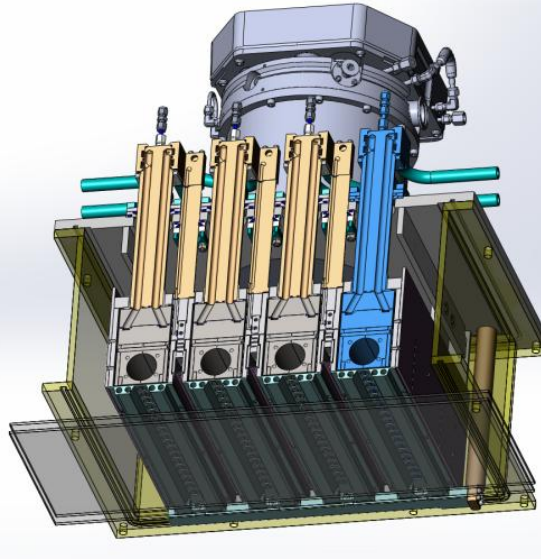
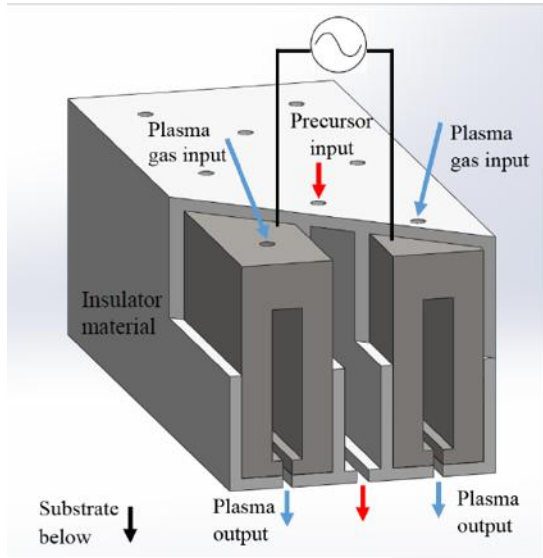
Magnetron sputtering



Magnetron sputtering



Plasma Enhanced Chemical Vapor Deposition (PECVD)



Industrial glass coating equipment





**Long-term experience in
coating production**



**Latest developments and
innovations**



**Access to demonstration lab
of coating development and
prototyping**



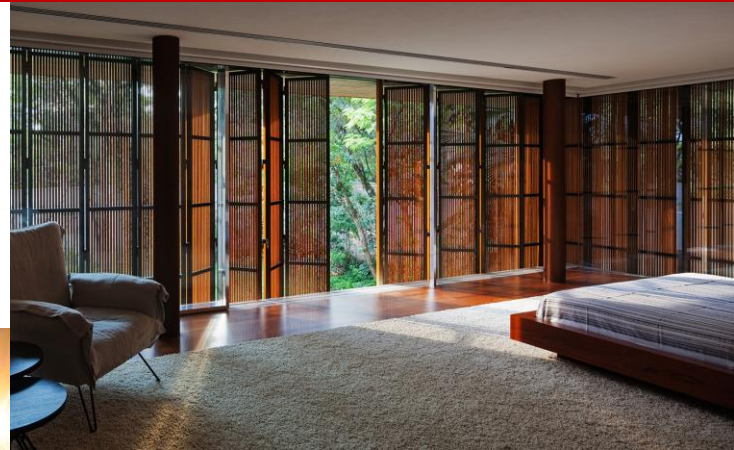
**In-house engineering
experience and turn-key
solutions**



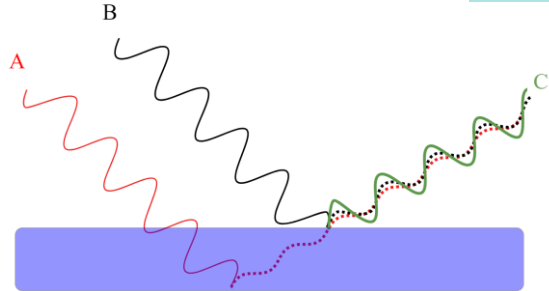
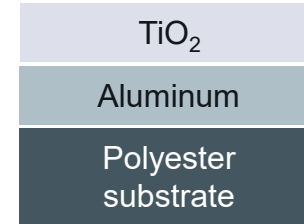
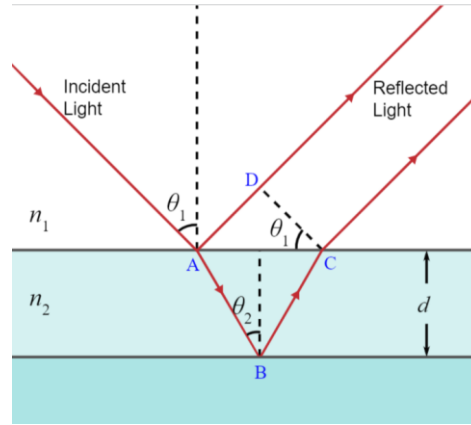
**International team of plasma
experts at your service**



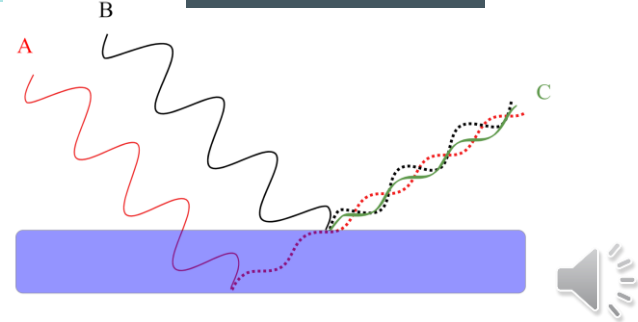
Case study 1: Coloration of textiles



Case study 1: Coloration - Thin-film interference



Constructive phase interaction



Destructive phase interaction

Case study 1: Coloration - Experimental

8 nm TiO_2

26 nm TiO_x

100 nm Al

Polyester
substrate

6 nm TiO_2

66 nm TiO_x

37 nm Ti

100 nm Al

Polyester
substrate

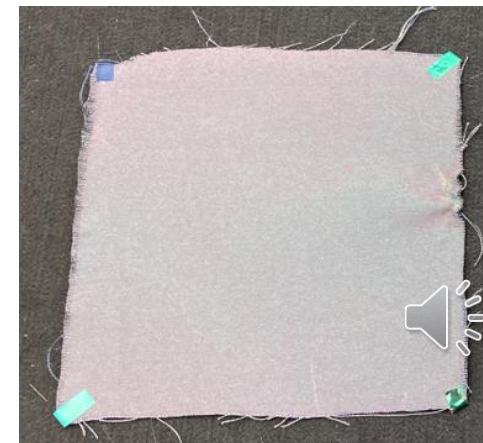
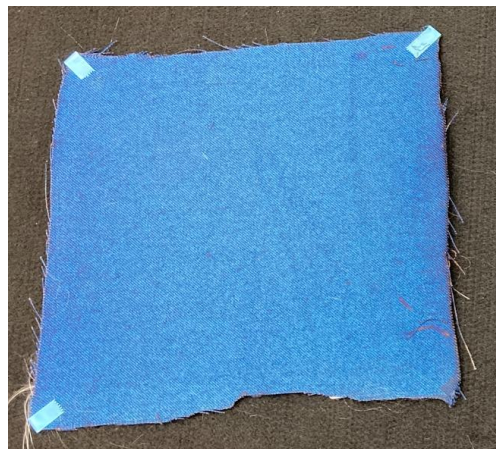
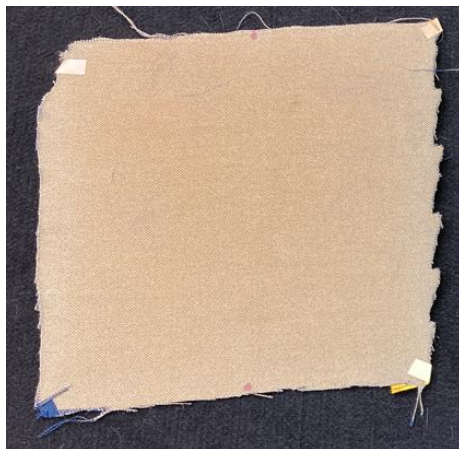
148 nm TiO_2

210 nm TiO_x

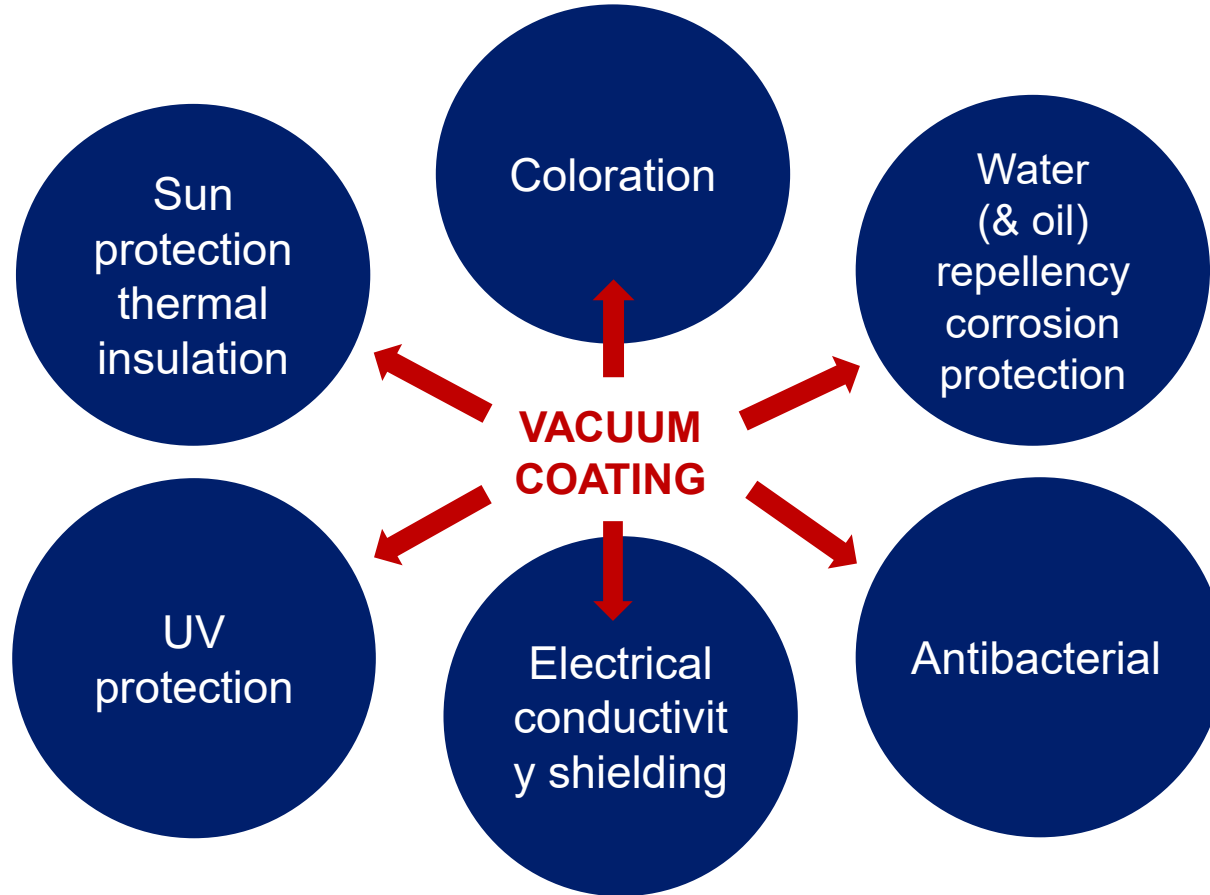
84 nm Ti

100 nm Al

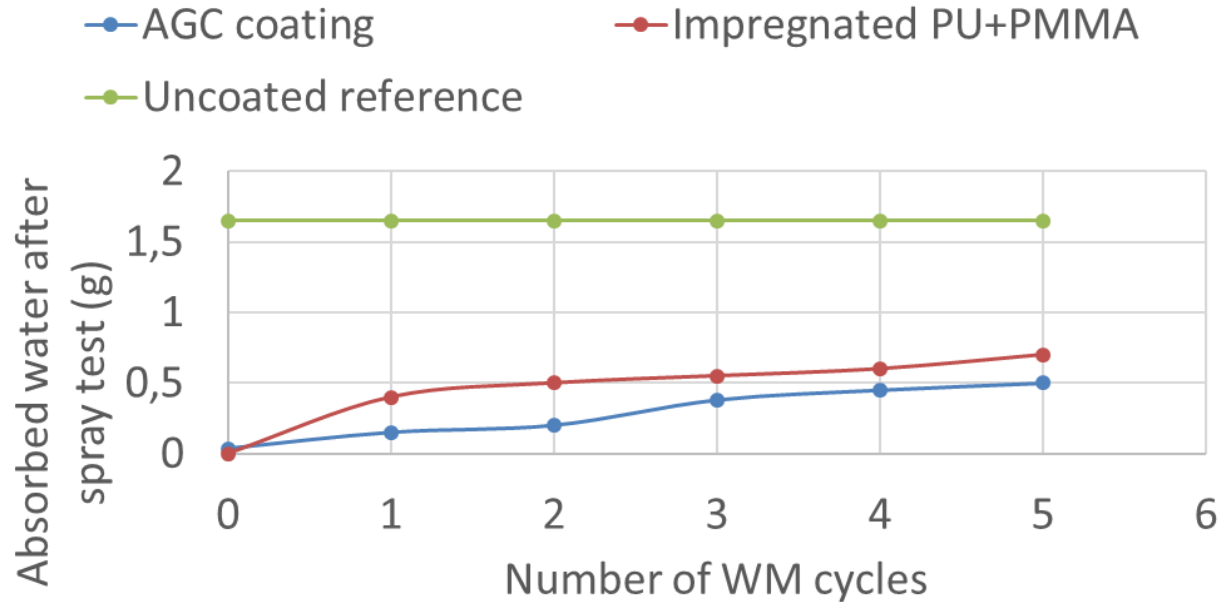
Polyester
substrate



Potential application in textiles



Case study 2: Fluor-free water repellency



Spray test (ISO 4920)
Washing machine at 40°C for 2 h with 1000 rpm

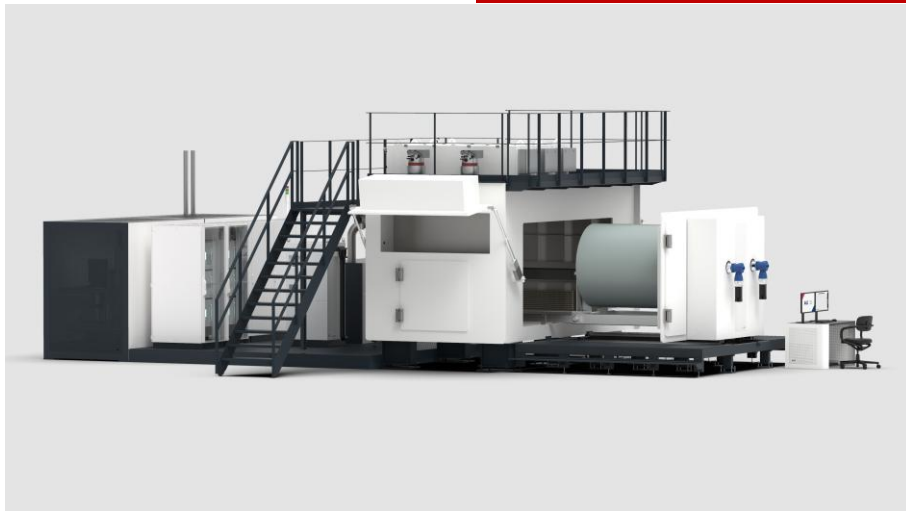




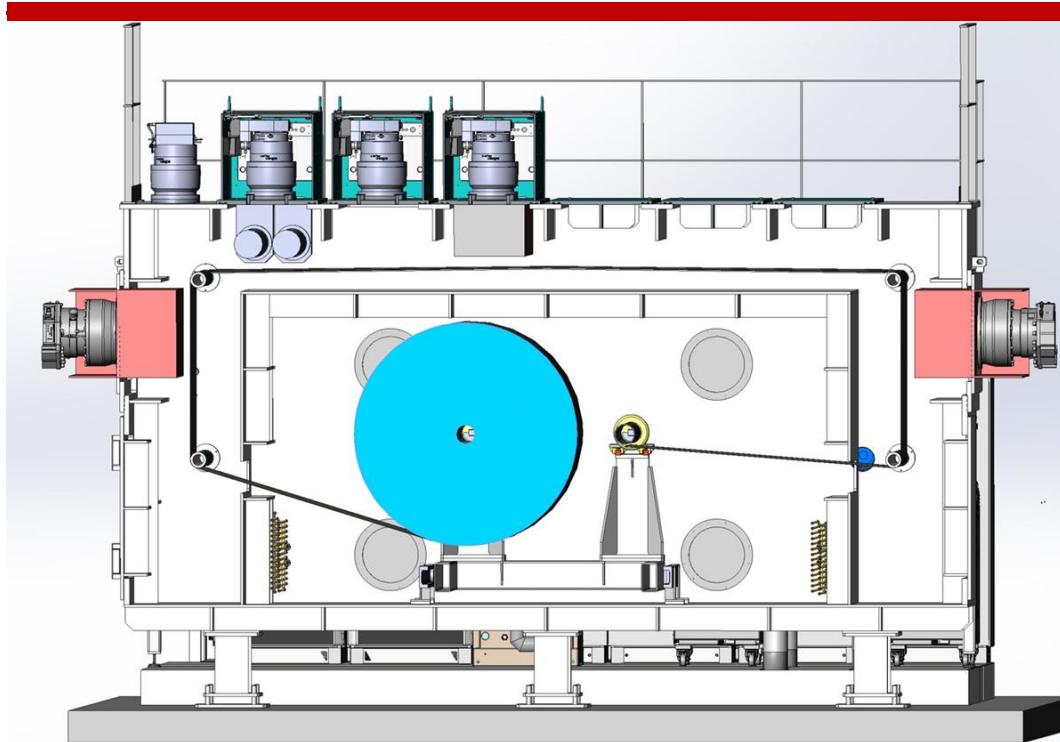
- Proof of concept and small initial series
- Roll width till 1.6 meter wide
- Magnetron sputtering + PECVD
- Lauenförde, Germany (near Göttingen)



Concept proposal for industrial line



Concept proposal for industrial line



- Bringing vacuum coating technology on an **industrial scale** available for textiles
- **Environmentally** friendly
- Wide variety of **properties** can be obtained
 - Aesthetics
 - Heat reflection
 - Water repellent
 - UV protection
 -
- **Demonstration line** in Lauenförde, Germany (near Göttingen) 
- **Tailor made** industrial equipment

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