

Plasma & Corona Surface Treatment

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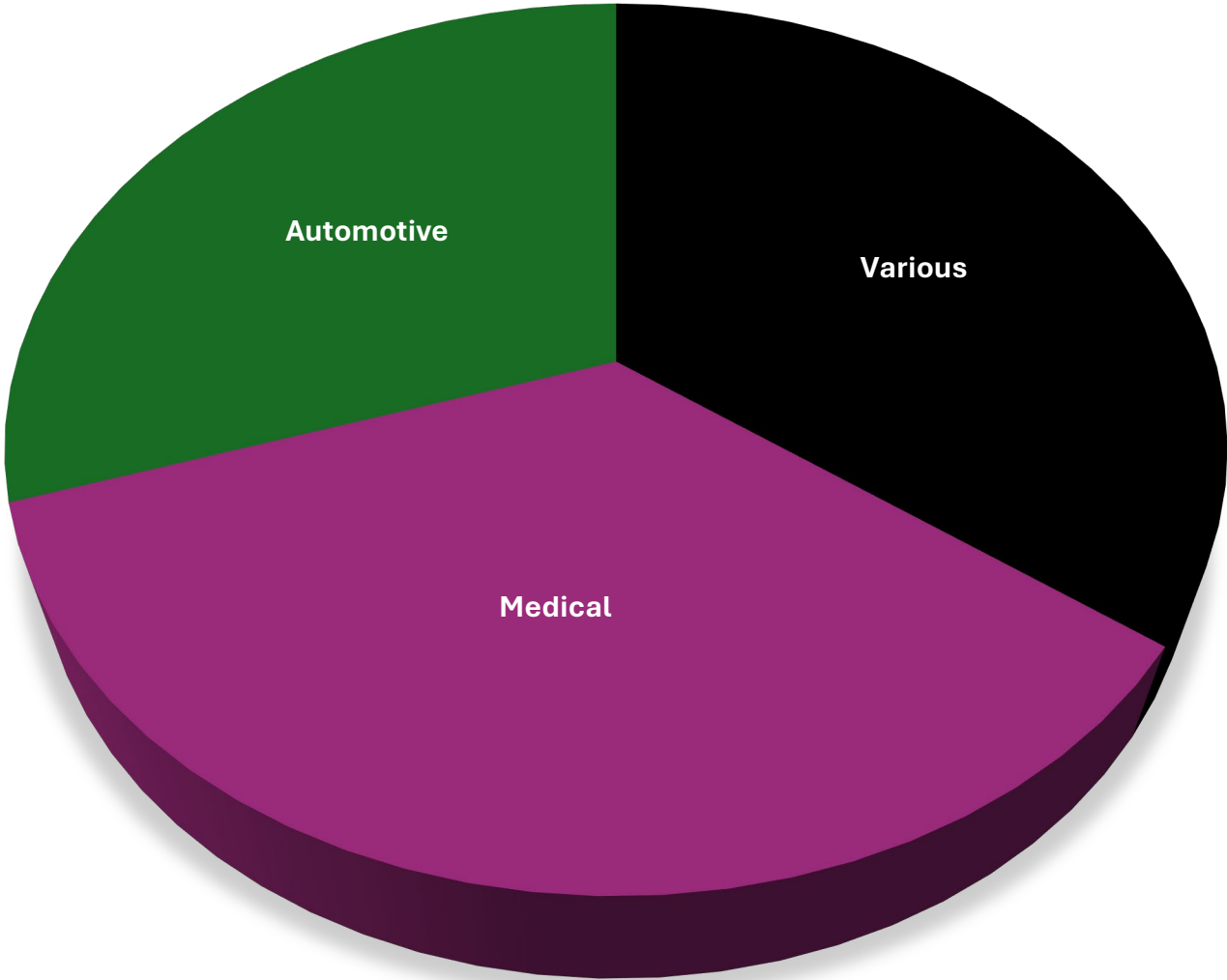
Tantec wants to be a preferred worldwide supplier and adviser for surface treatment within the medical device industry, automotive industry and other quality-driven industries



Founded 1974 in
Lunderskov, Denmark

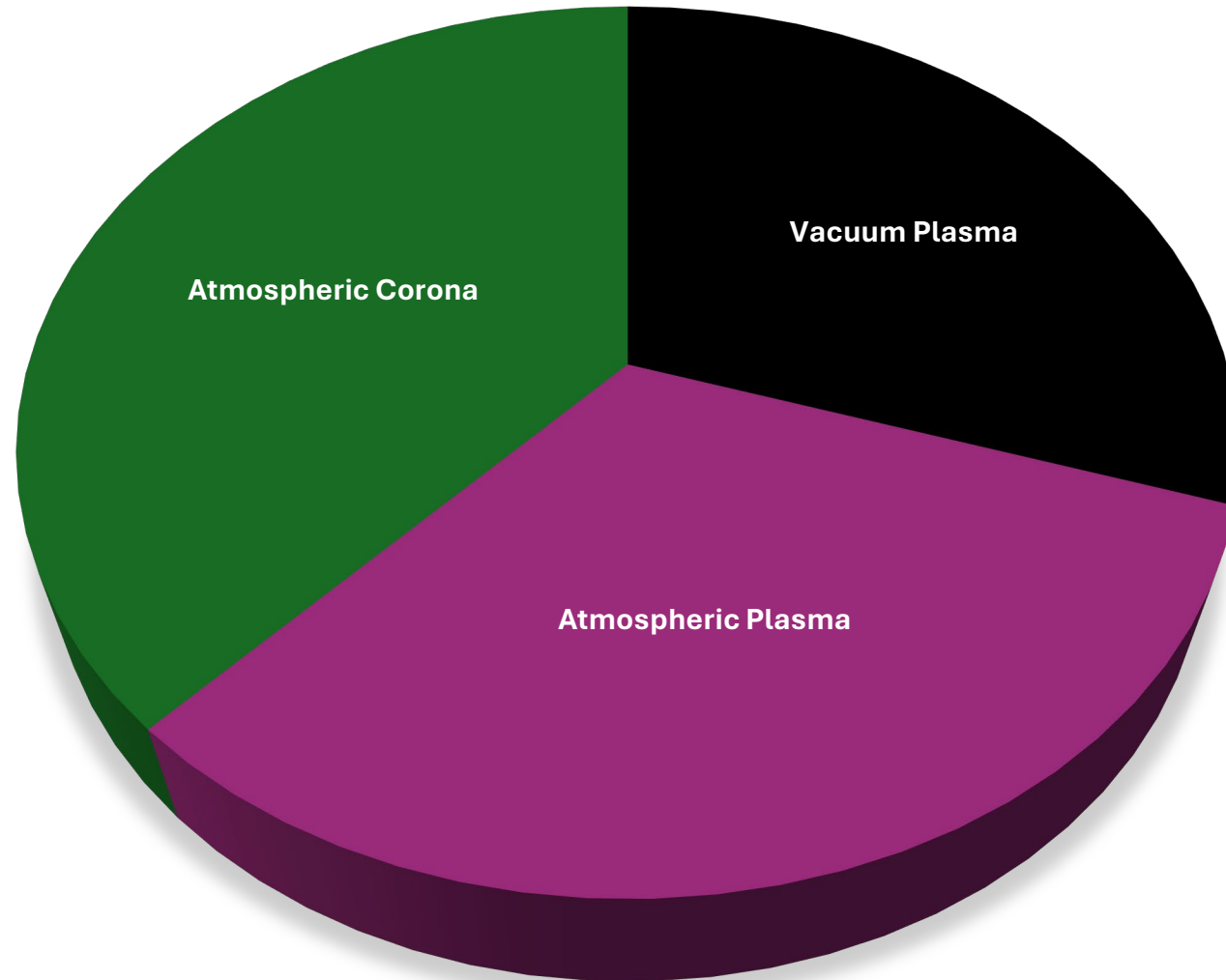


TANTEC INDUSTRIES



Various:
Cable and Pipes
Foam and Board
Packaging
Electronic
Metal

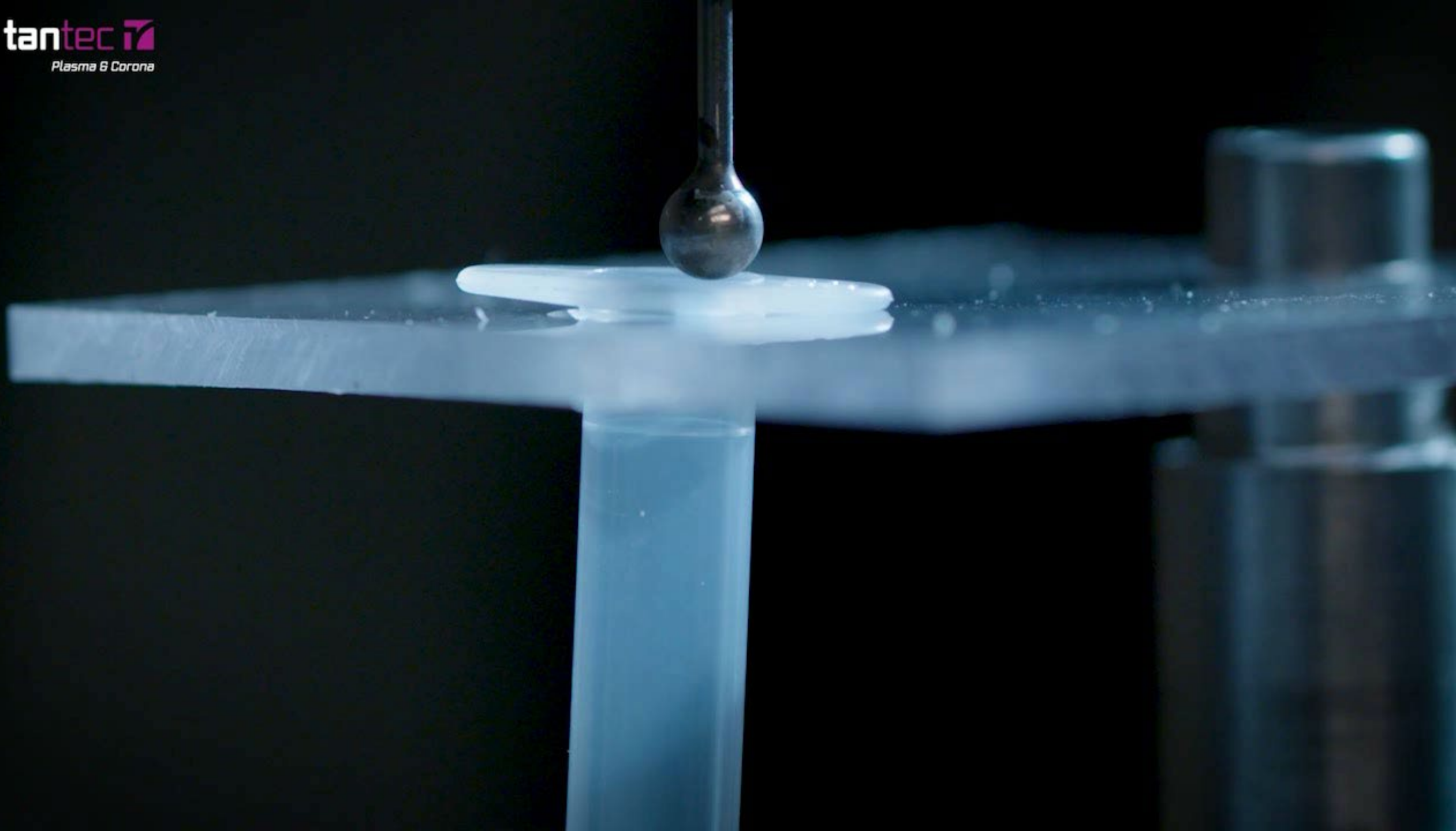
TANTEC TECHNOLOGIES



REPRESENTED BY AGENTS IN 30 COUNTRIES WORLDWIDE



Sister company:
Tantec EST Inc. Chicago, USA





POOR ADHESION IS A PAIN
THAT RESULTS IN POOR QUALITY





GAINS OF SURFACE TREATMENT

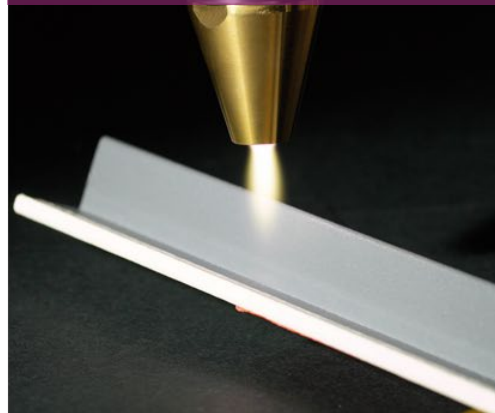
Improved Adhesion




Improved Wettability




Surface Cleaning





THE DIFFERENCE: CORONA AND PLASMA TREATMENT?




ATMOSPHERIC


Corona 
– High frequency


Corona 
– Low frequency


DBD 
– Dielectric Barrier Discharge




PRESSURE

Plasma 
– Jet System

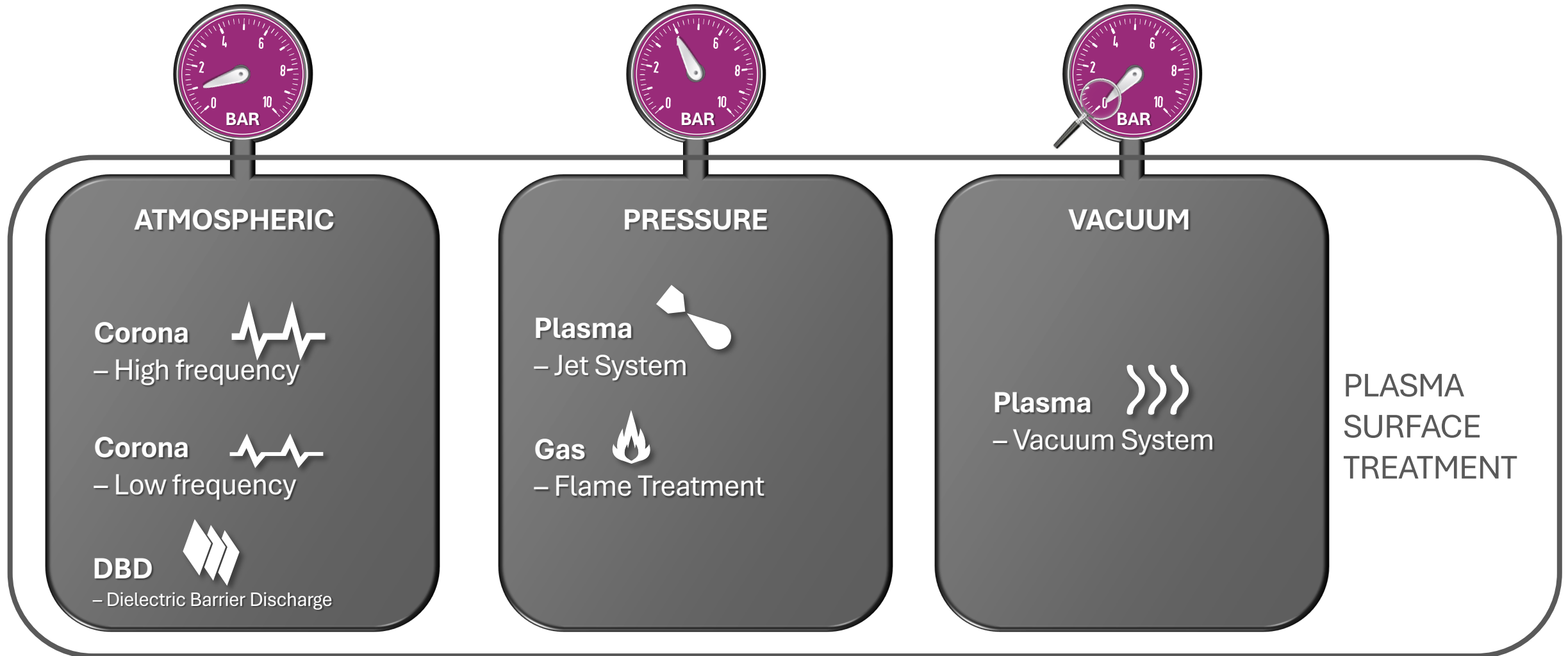
Gas 
– Flame Treatment



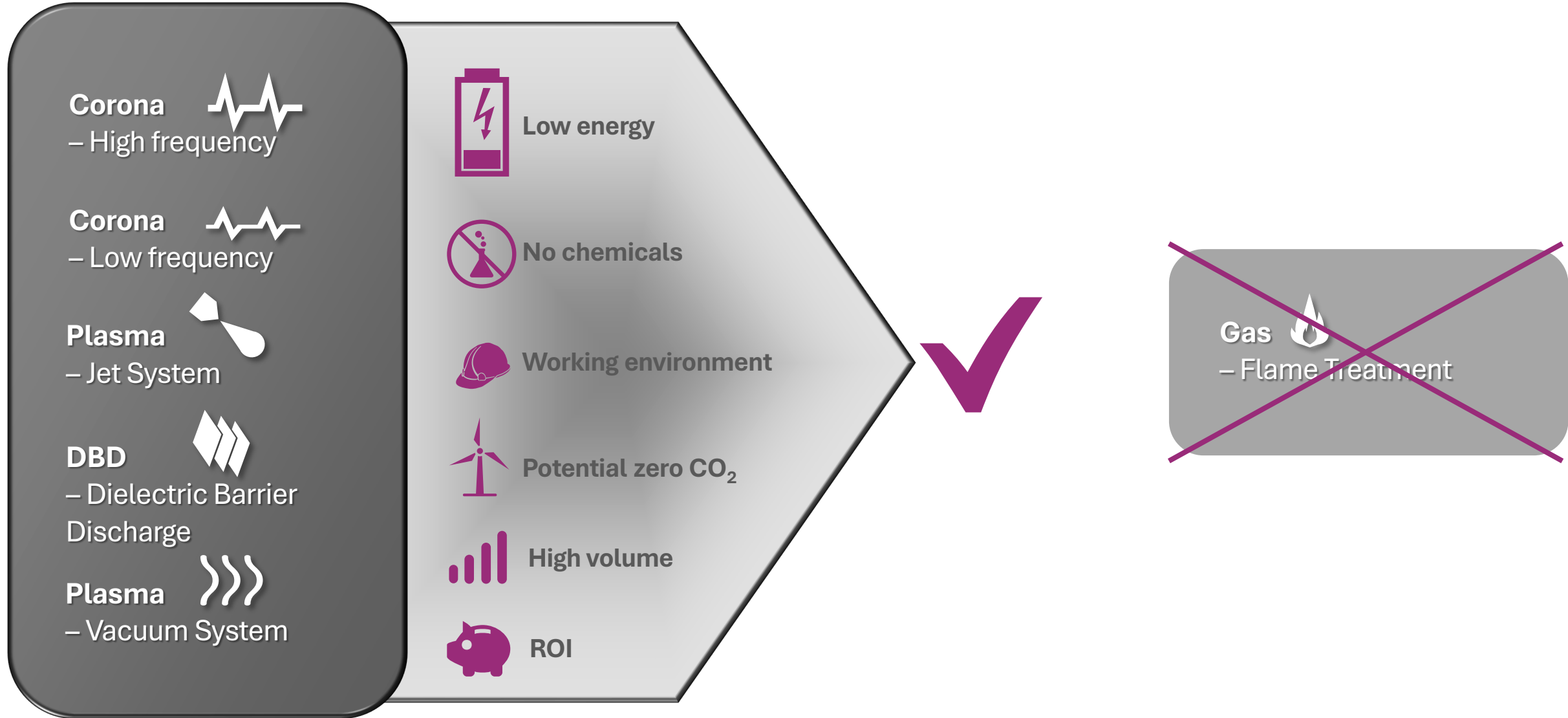
VACUUM

Plasma 
– Vacuum System

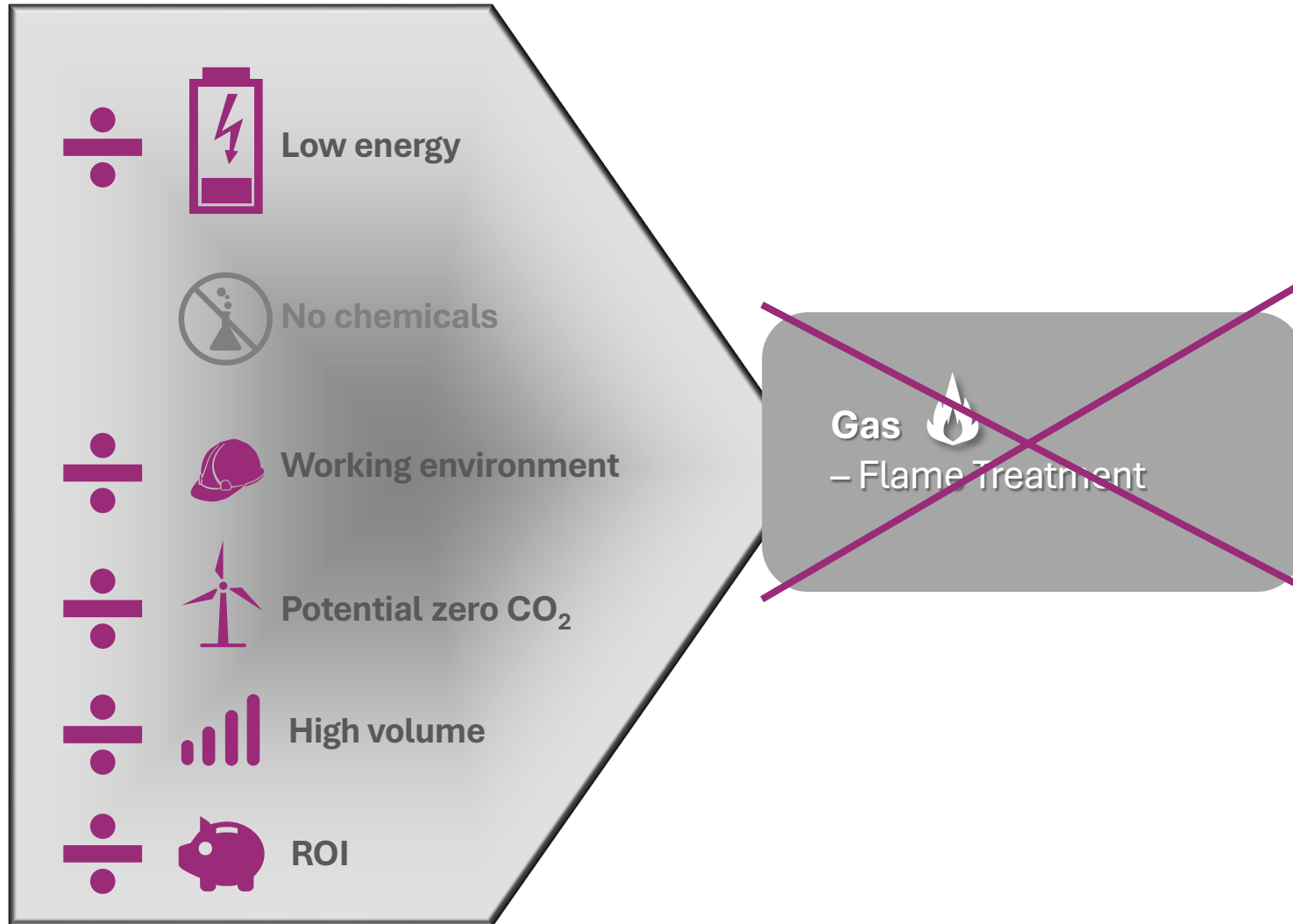
ANSWER: IT IS ALL PLASMA – CORONA IS ONE PLASMA TECHNOLOGY



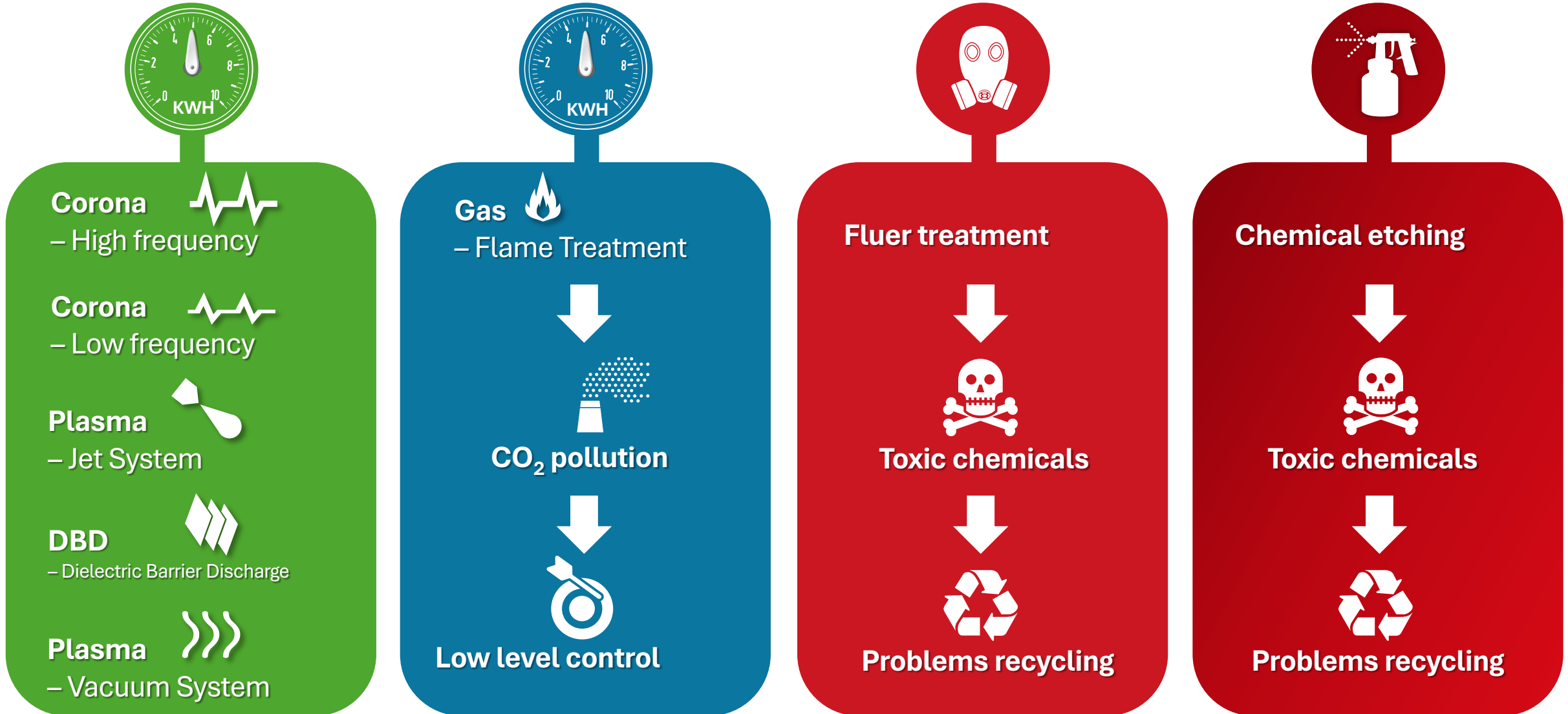
WE ARE THE ONLY COMPANY IN THE WORLD OFFERING ALL ELECTRICAL SURFACE TREATMENT TECHNOLOGIES



WE DON'T OFFER FLAME TREATMENT ANYMORE



SURFACE TREATMENT COMPARISON: ENERGY & ENVIRONMENT



The Surface

Outer surface layers play an important role to surface properties

Äußere Grenzschichten beeinflussen entscheidend die Oberflächeneigenschaften

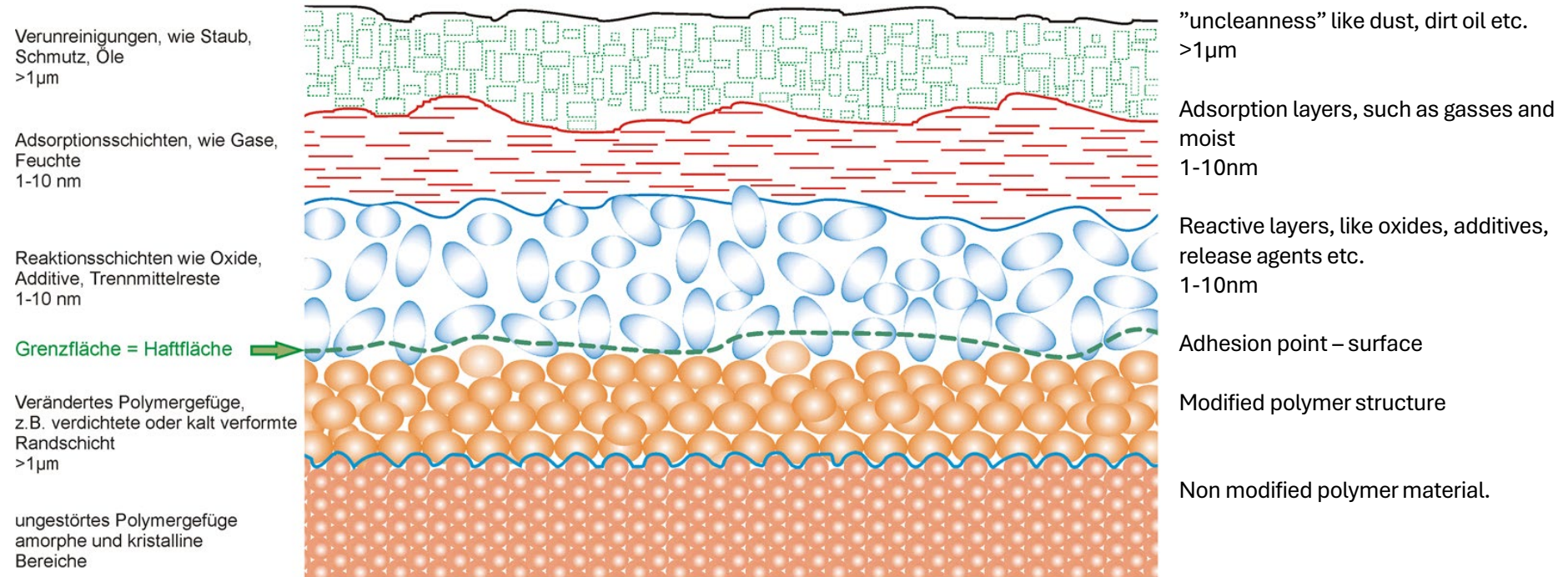
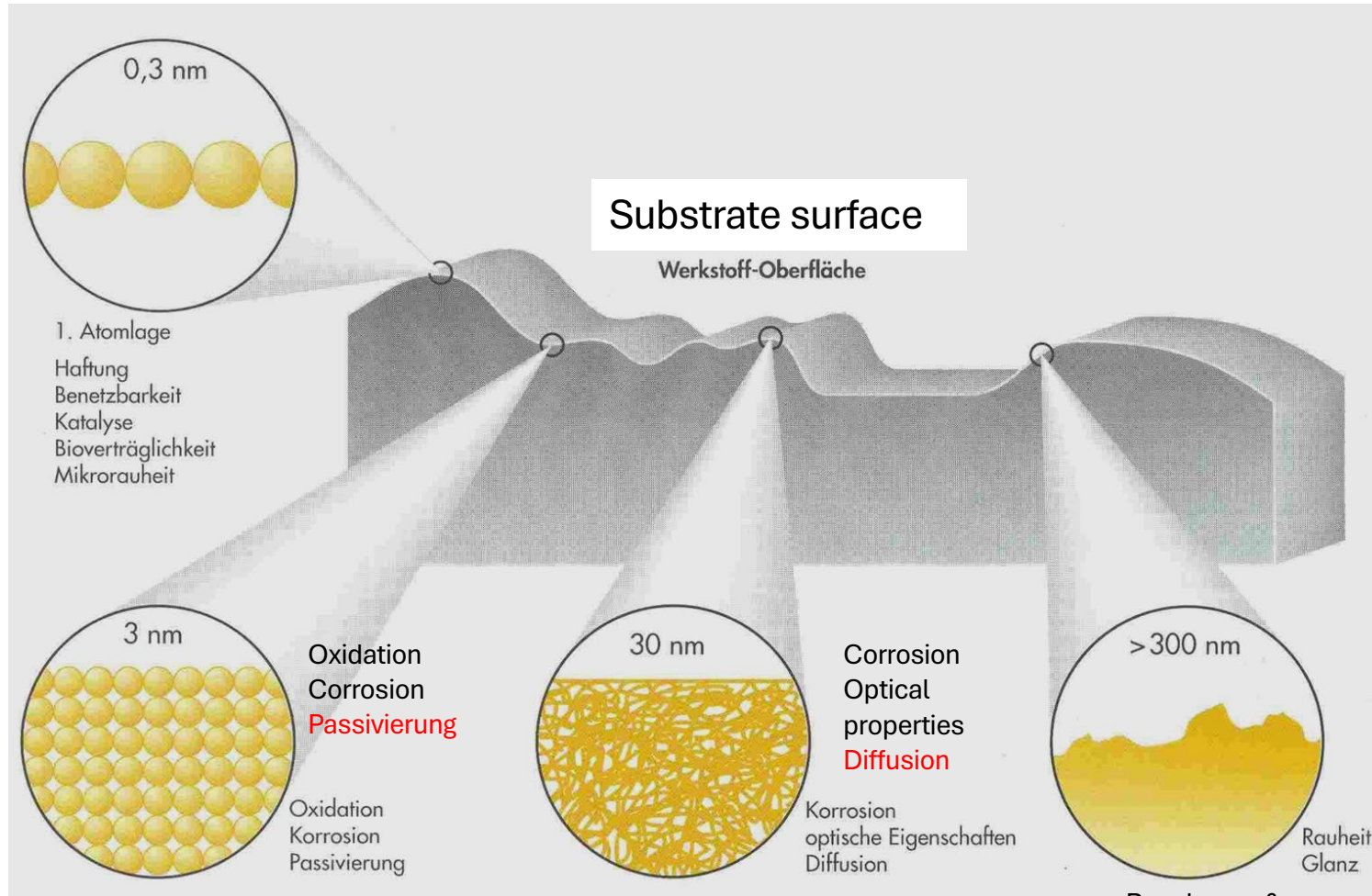


Bild: Dipl.-Ing. (FH) Simone Fischer

The Surface



1st atomic layer
Adhesion
Wettability
Katalyse
Bioverträglichkeit
Mikrorauheit

Bild: Dipl.-Ing. (FH) Simone Fischer

Roughness &
Gloss

What is **surface treatment** and what happens?

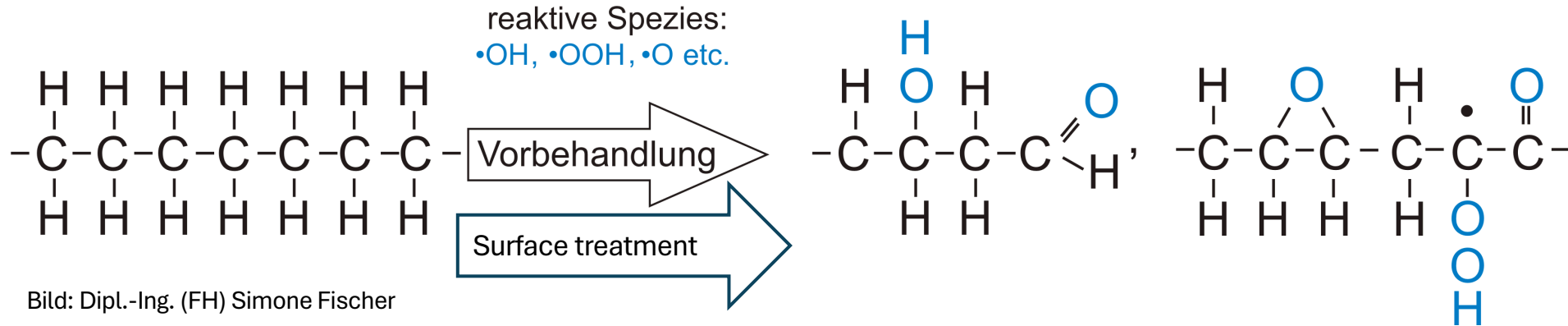


Before treatment:
Poor wettability

**Corona
or
Plasma**

After treatment:
**Perfect wettability
and adhesion**

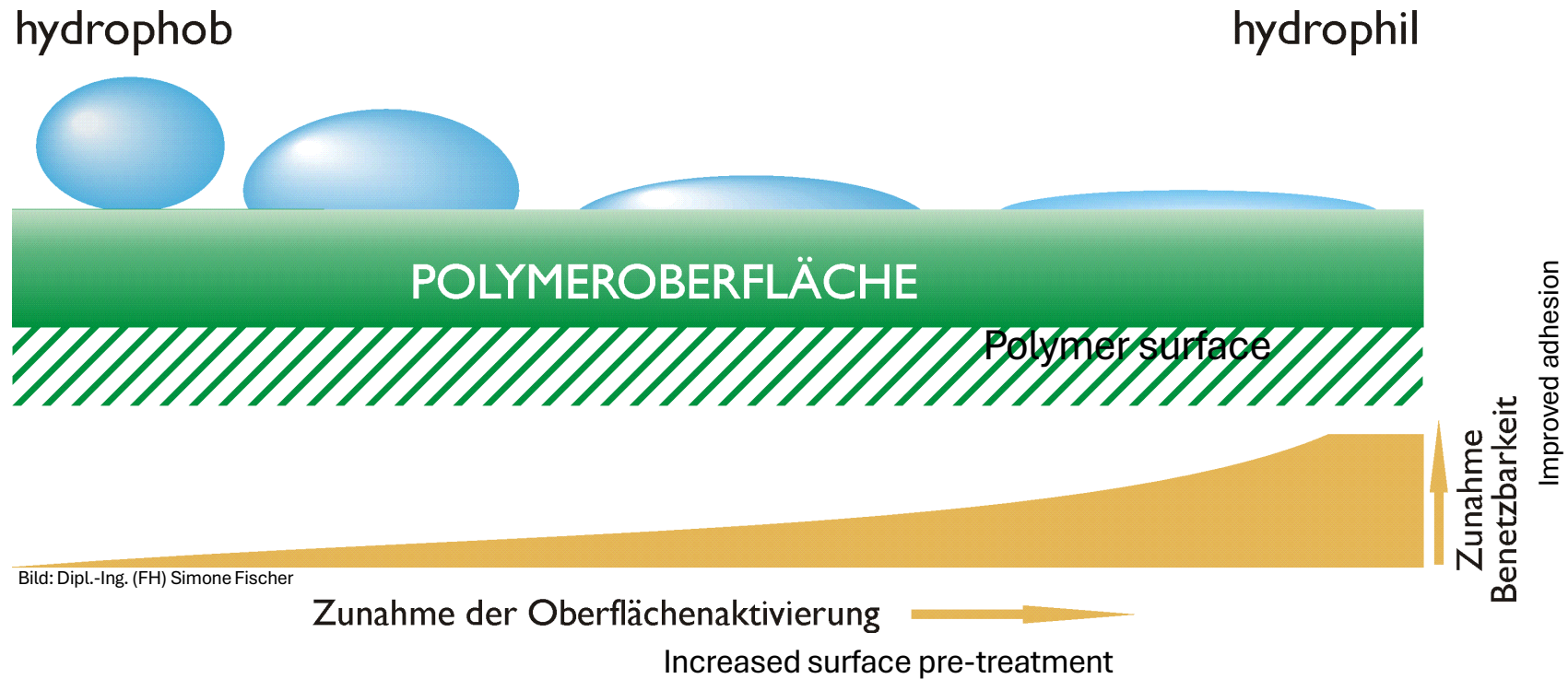
Reaction on the Surface



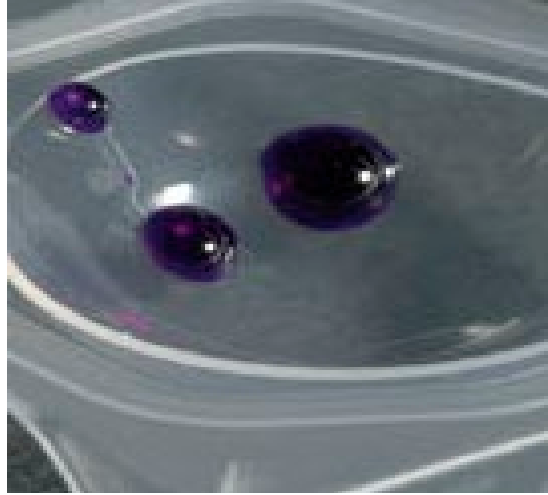
- Radicals created by the plasma discharge breaks the polymer bonds on the surface.
 - Oxygen containing groups will be introduced into the polymer surface
- ⇒ Increased wettability on the polymer surface

Wettability

Surface Pre-Treatment effect on the wettability of Polymer surfaces

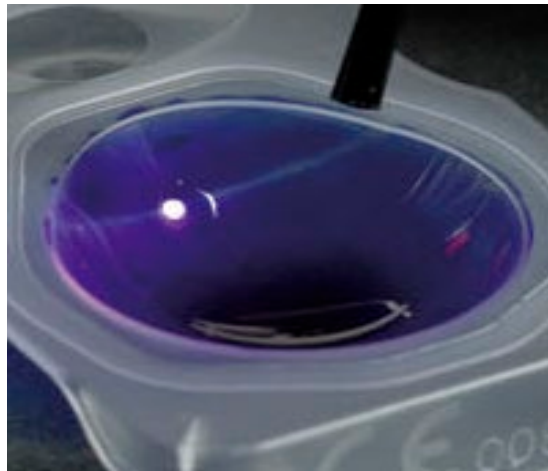


Surface Energy



Low surface energy material

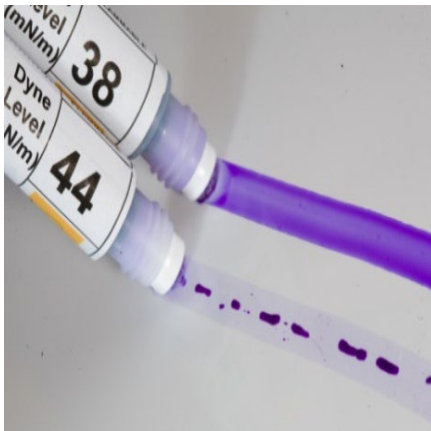
Liquid does not “wet” the surface



High surface energy material

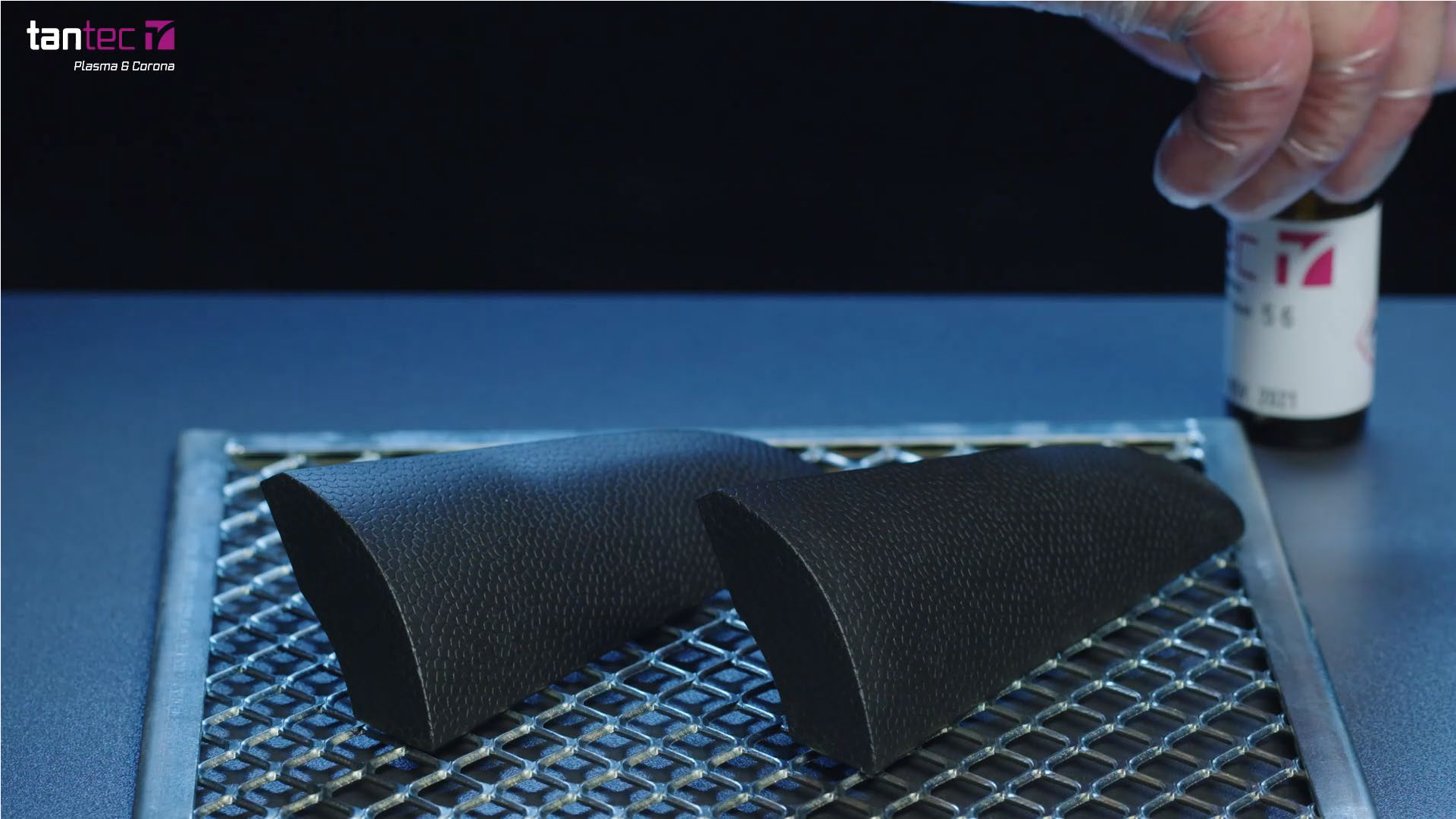
Liquid “wets” the surface

Surface Energy



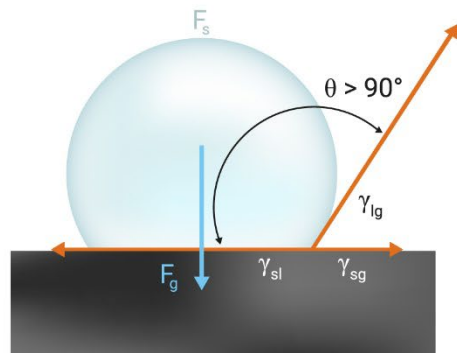
Norms for measuring surface energy

- The measured value is referred to as mN/m or dyne/cm
- If the dispensed liquid pulls together and forms droplets (within 2-3 seconds) the value is not achieved
- This type of surface measurement is based on ISO 8296. Method for determining surface energy on PE film.

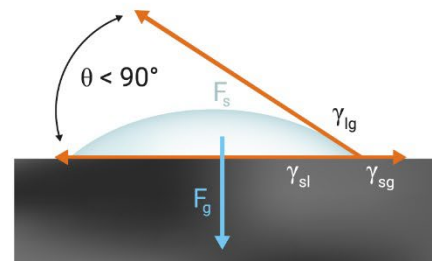


Contact Angle

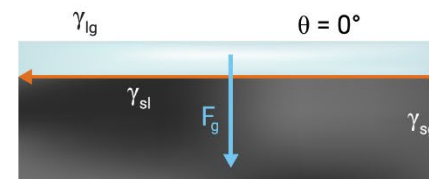
- The wettability can be measured using contact angle meters
- Both Polar and Non-Polar measurements are possible
- The contact angle is measured as the tangent line from the "corner of the water droplet"



Hydrophobe



Hydrophile

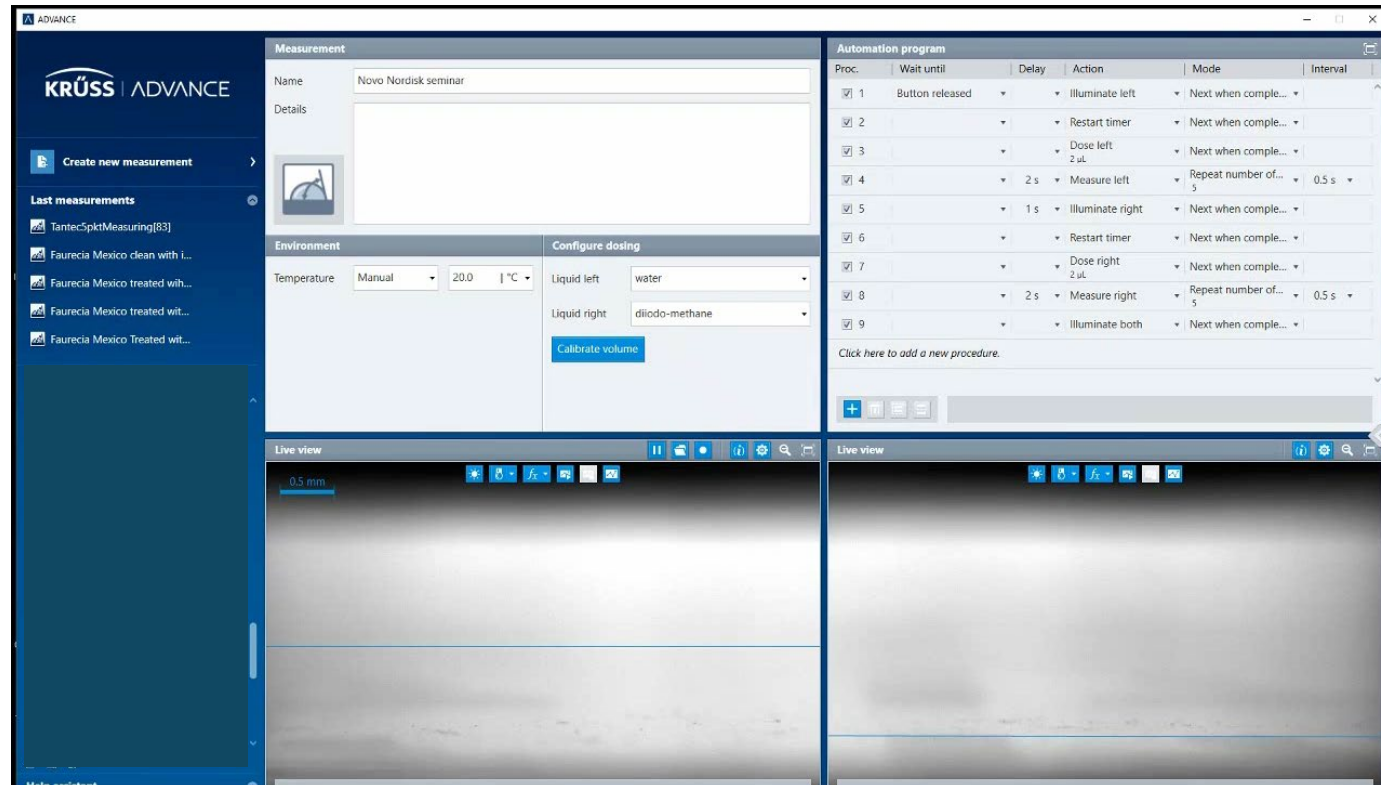


Perfect wetting

How to **measure** surface energy

Contact angle meter measurement

Not treated



Surface free energy: 44,85 mN/m

Disperse: 41,03

Polar: 3,82

How to **measure** surface energy

Contact angle meter measurement

Treated

The screenshot displays the KRÜSS ADVANCE software interface. The left sidebar contains navigation options: 'Create new measurement' and 'Last measurements' with a list of previous entries. The main area is divided into several sections:

- Measurement:** Name: 'Novo Nordisk seminar Treated material'. A details field is empty.
- Environment:** Temperature: Manual, 20.0 °C.
- Configure dosing:** Liquid left: water, Liquid right: diiodo-methane. A 'Calibrate volume' button is present.
- Automation program:** A table with 9 rows of actions.

Proc.	Wait until	Delay	Action	Mode	Interval
<input checked="" type="checkbox"/>	1	Button released	Illuminate left	Next when comple...	
<input checked="" type="checkbox"/>	2		Restart timer	Next when comple...	
<input checked="" type="checkbox"/>	3		Dose left 2 µL	Next when comple...	
<input checked="" type="checkbox"/>	4	2 s	Measure left	Repeat number of... 5	0.5 s
<input checked="" type="checkbox"/>	5	1 s	Illuminate right	Next when comple...	
<input checked="" type="checkbox"/>	6		Restart timer	Next when comple...	
<input checked="" type="checkbox"/>	7		Dose right 2 µL	Next when comple...	
<input checked="" type="checkbox"/>	8	2 s	Measure right	Repeat number of... 5	0.5 s
<input checked="" type="checkbox"/>	9		Illuminate both	Next when comple...	

Below the configuration sections are two 'Live view' windows showing a blurred image of the measurement setup. The top-left live view includes a scale bar for 0.5 mm.

Surface free energy: 62,28 mN/m

Disperse: 38,53

Polar: 23,76

OzoneTEC

Tantec's OzoneTEC solution helped a leading manufacturer of premium outdoor coolers improve the durability and quality of its roto-molded products by solving a critical adhesion challenge between the polyethylene shell and the insulating foam inside.



OzoneTEC
Surface Treatment
with Ozone

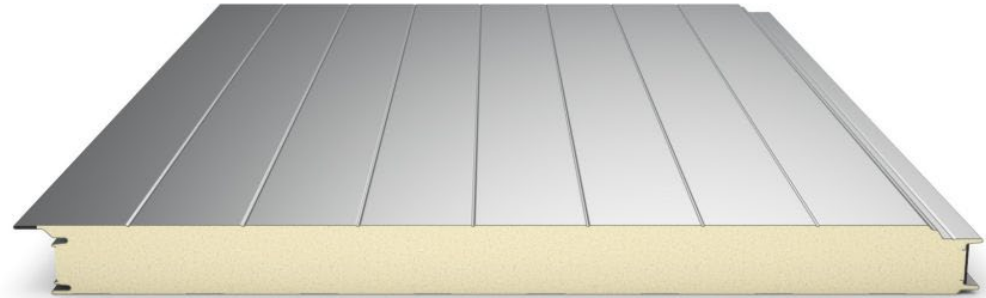
Richard Wilcox case

Richards Wilcox, a manufacturer of garage doors, sought to improve adhesion between steel panels and polyurethane foam. After testing several technologies, they chose Tantec's corona treatment, which significantly increased surface energy and improved bonding.

The company installed two SheetTEC units in their production line, reporting smooth integration, easy operation, and consistently better product quality.



Heating pipes – wall panels



Catheter

