



AP Plasma

Surface Treatment Solution on the TOP

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SAP Plasma
Shermann's
Atmospheric Pressure Plasma

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- What is Plasma?
- SAP Plasma Mechanism
- SAP Plasma Module
- Verification

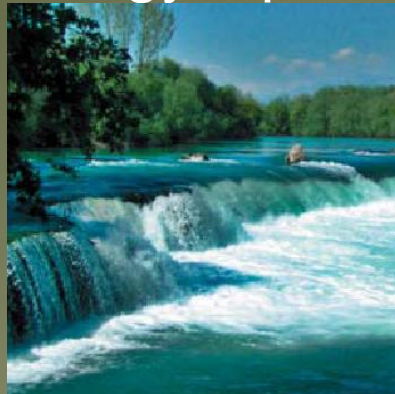
What is Plasma?

Plasma is the fourth state of matter

With increasing energy input, the state of matter changes from



SOLID



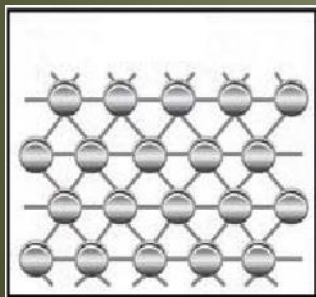
LIQUID



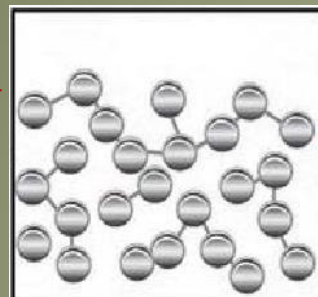
GAS



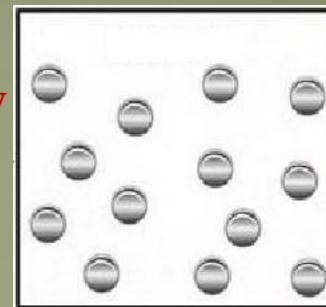
PLASMA



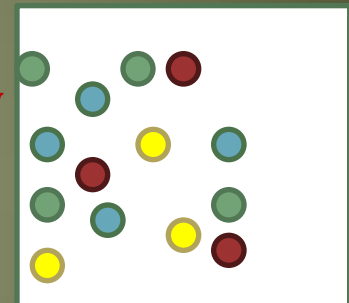
energy



energy



energy



What is Plasma?



Plasma Characteristic

The measuring variables that particularly characterize plasma are electron temperature and emission of various species excited in the ultraviolet and visible range.

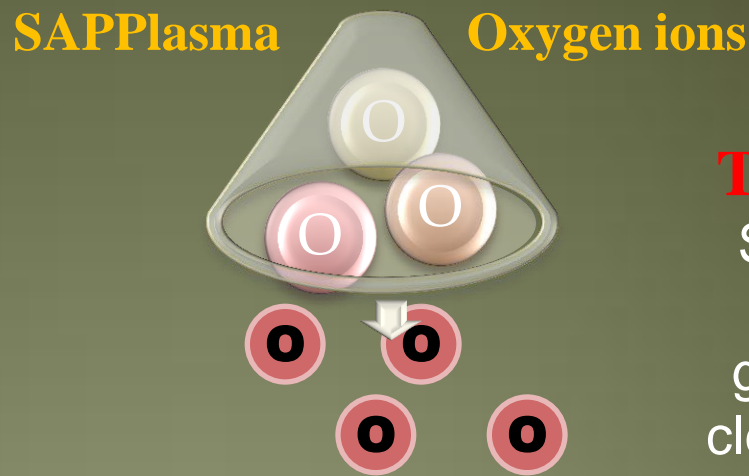
- What is Plasma?
- **SAP Plasma Mechanism**
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SAPP Mechanism

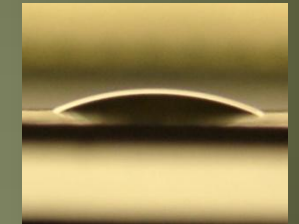
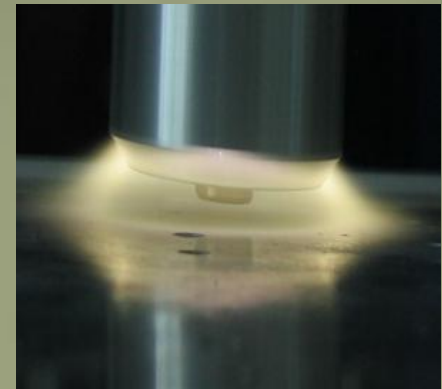
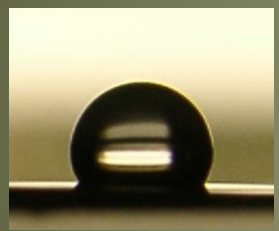
Atmospheric pressure plasma treatment is one of the most efficient surface treatment processes for **cleaning, activating, or coating materials** like organic compound, metal (such as Al, Cu...), carbon fiber or glass.

SAPP Mechanism

Cleaning

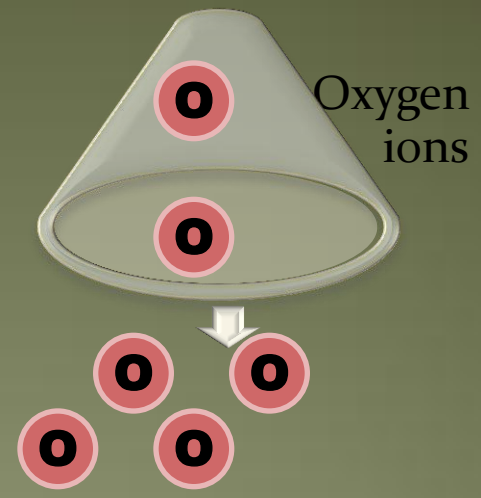


Totally DRY
 SAP Plasma
 cleaning
 guarantees a
 clean and cost-
 effective overall
 process

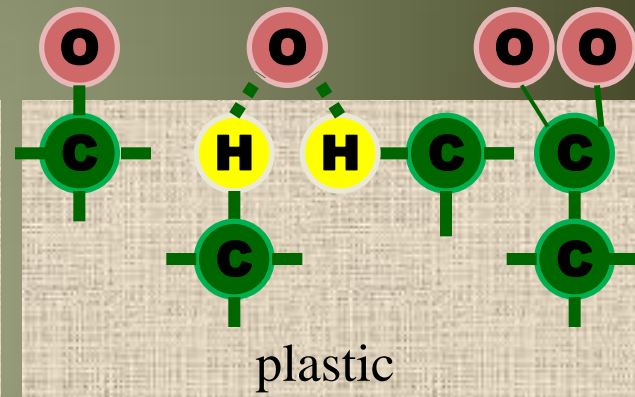
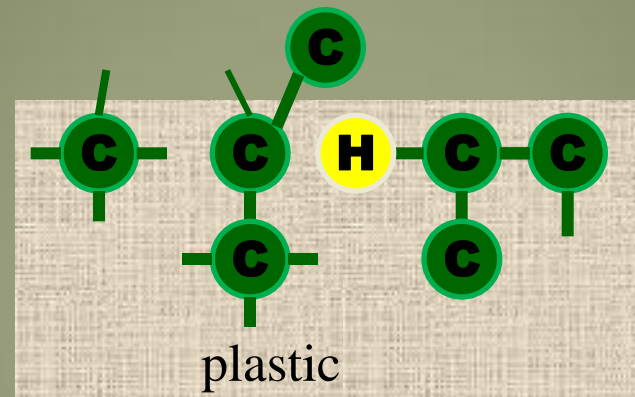
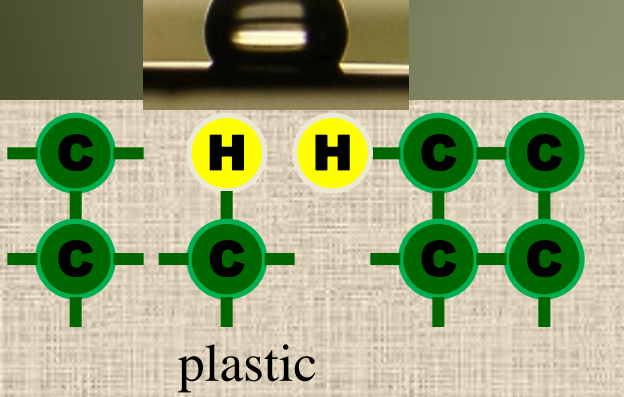


SAPP Mechanism

Activating

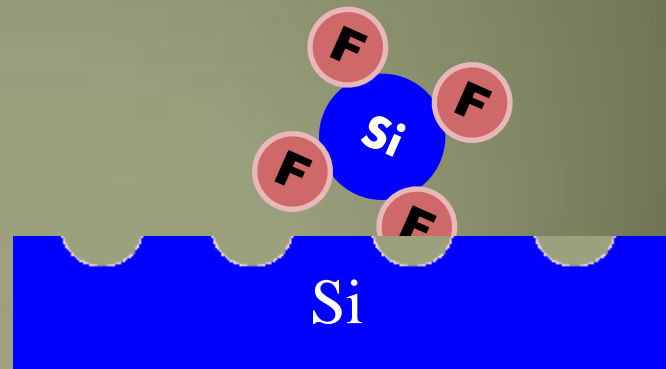
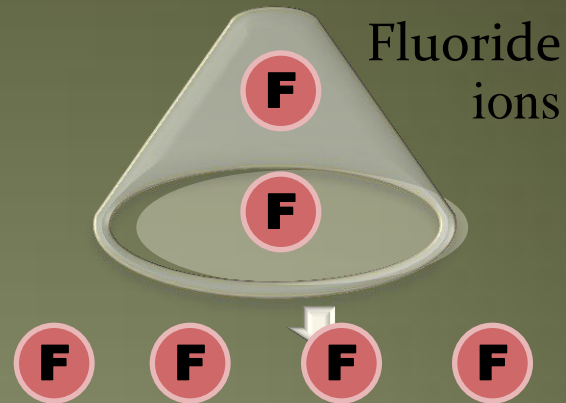


Chemical Bonding



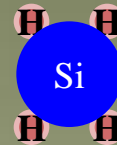
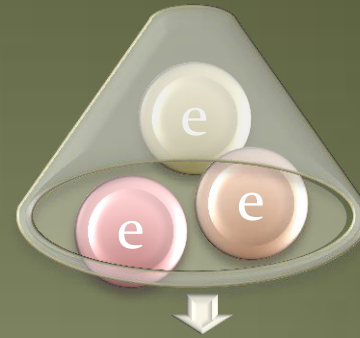
SAPP Mechanism

Etching/Ashing



SAPP Mechanism

Coating



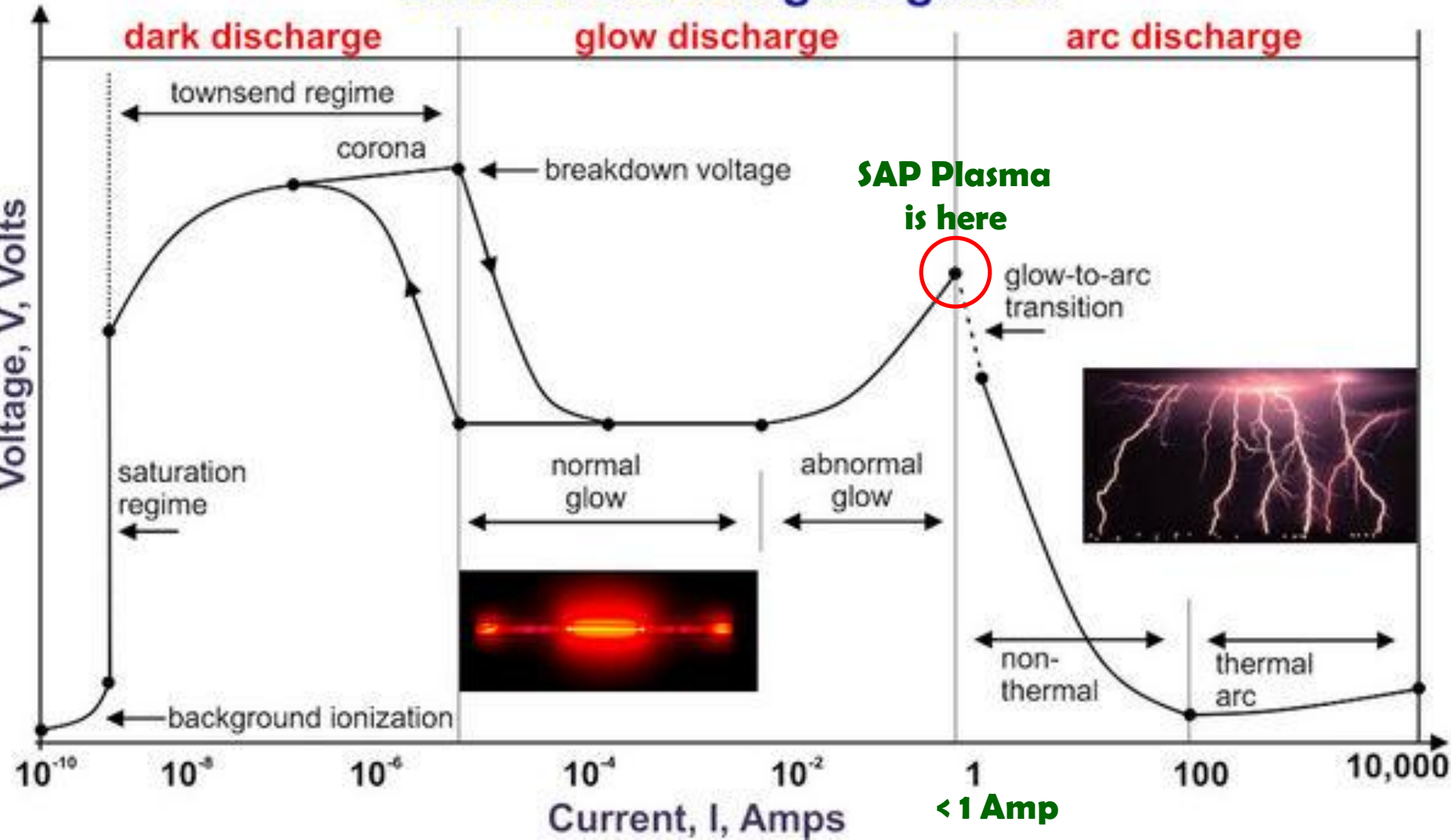
Si

Si

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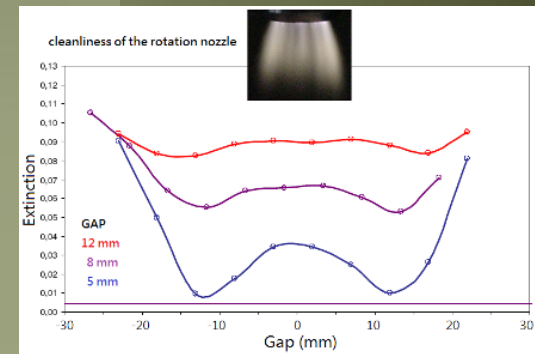
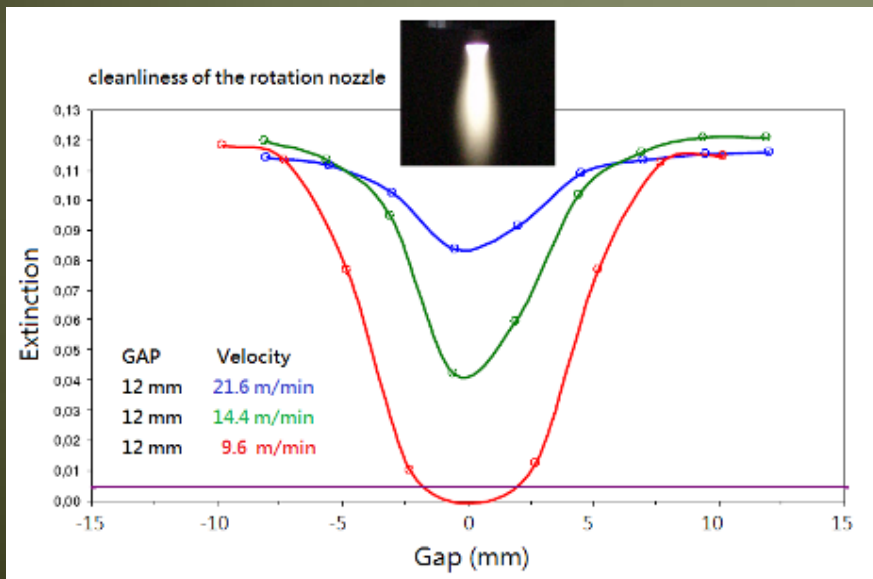
SAPP Module

Electric discharge regimes



SAPP Module

By ionizing the appropriate proportion of oxygen / nitrogen molecules in the air, **the frequency adjustable SAP-Plasma** is able to produce the specified polar functional groups (-OH, -CH, -NH, -COOH ...), and meet the chemical bonding requirements of the glue or ink (solvent or water-based) on the substrate.



SAPP Module

Power Supply




SHERMANN TECH. Ltd.		
SAP VI/SI Power Supply		
Voltage	VAC	220 Single 50/60Hz
Rated Power (Single)	KW	2.82
	KVA	4.86
Max. Input Current	A	22
Output Power	Wrms	300 ~ 999 (±5%)
Output Frequency	KHz	SAP-VI series 20.0 ~ 40.0 (±0.1%)
		SAP-SI series 21.0 ~ 33.0 (±0.1%) pre-set
Unloading Voltage	Vp-p	12K
Loading Voltage	Vp-p	6K
Output Current	Arms	0.2 ~ 1.2
Interface	RS485	SAP-VI4.0 5", 800x480(16:9), 64k Colors, TFT-LCD, WinCE, Internet
	External Control	SAP-SI01 No Panel, Pre-set
		SAP-VI4R Keypad, Adjustable
		1~2 Activate Remote Power Switch
3~4 Activate Remote Emergency Stop Switch		
Standby Power	W	50
Pre-Input Air Time	sec	1
Cooling Air Relay Time	min	2
Air Pressure Input	kgf/cm ²	Pre-Set 5.0 (±0.5)
Air Pressure Alarm	kgf/cm ²	Pre-Set 4.0 (±0.5)
Output Air Setting	kgf/cm ²	Panel (>2.0)
Flow Rate	slm	40 @2.0 gf/cm ²
Over Heat	°C	75 Cut/70 Reset
Rated Efficiency	%	100 (<40°C)
Operating Temp.	°C	+5~+50
Storage Temp.	°C	-10~+60
Insulation Class		H
Protection Class		IP21
Grounding		First Class: Resistance < 10Ω、 Copper Wire OD>5.5 mm ²
Dimensions	mm	W=292、D=605、H=445
weight	Kg	25

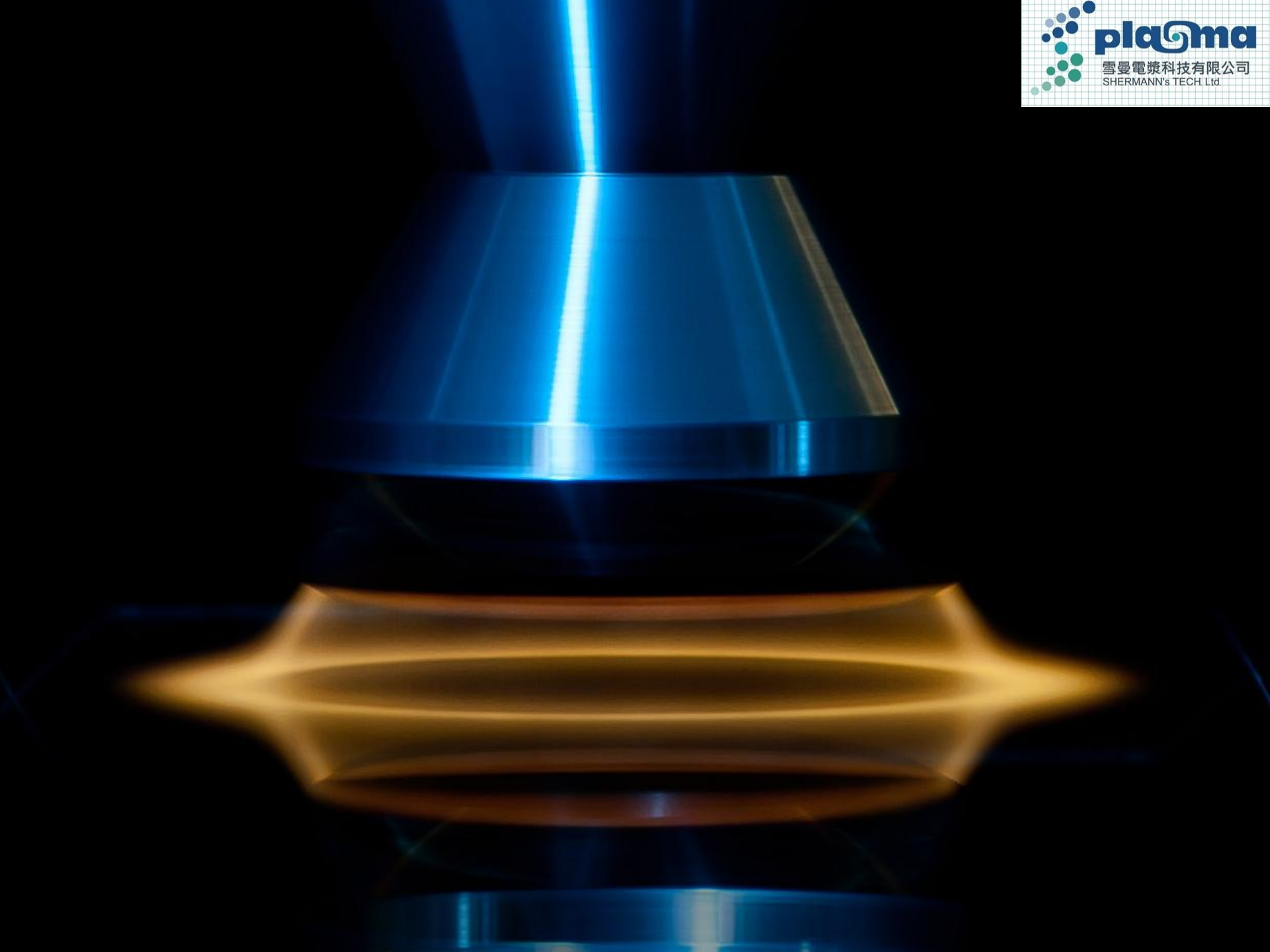


SAPP Module

AP Plasma BenchMark

Are you looking for AP-Plasma or ozone generator?

廠牌	台灣雪曼電漿科技 SAP-Plasma	PxxxTxxx	其他 Others
技術來源 Resource	Taiwan ITRI	Germany Frxxxxx	unknown
專利 Patents	~56	~40	unknown
營業模式 Model	Total Solution	Auto. Equipment	Auto. Equipment
技術比較 Diff.			
電源 Power	1~10kW	1~10kW	1kW
激發頻率 Freq.	Adjustable 15~40 kHz	20~40 kHz	Fixed 21/40 kHz
槍頭 Generator	Straight/Spin patented	Straight/Spin patented	Straight/Spin patent???
噴嘴 Nozzle	Arcing Free Φ 4, 8, 15, 20, 50mm	Partial zero potential Φ 4, 20, 50mm	Arcing Plasma or Ozone Generator?? Φ 4 or 20mm
Scanning Line Speed (M/min)/(cm ² /min) (CA < 10 @ glass)	> 20 > 4k	> 20 > 4k	<< 10 << 1k
Nozzle Life Time	> 6k hrs	> 6k hrs	500 hrs
Plasma Species	O ₂ Radial ~ 10 ¹² /cm ²	O ₂ Radial ~ 10 ¹² /cm ²	O ₂ Radial << 10 ¹² /cm ² Ozone
操作溫度 Temp.	< 80°C	< 80°C	> 100°C
操作氣體 Gas	AIR 、N ₂ 、O ₂ ...	AIR、N ₂ 、O ₂ ...	N ₂ 、O ₂ 、 mixed Gas
化學品搭配 Chemical Solution	YES	-	-

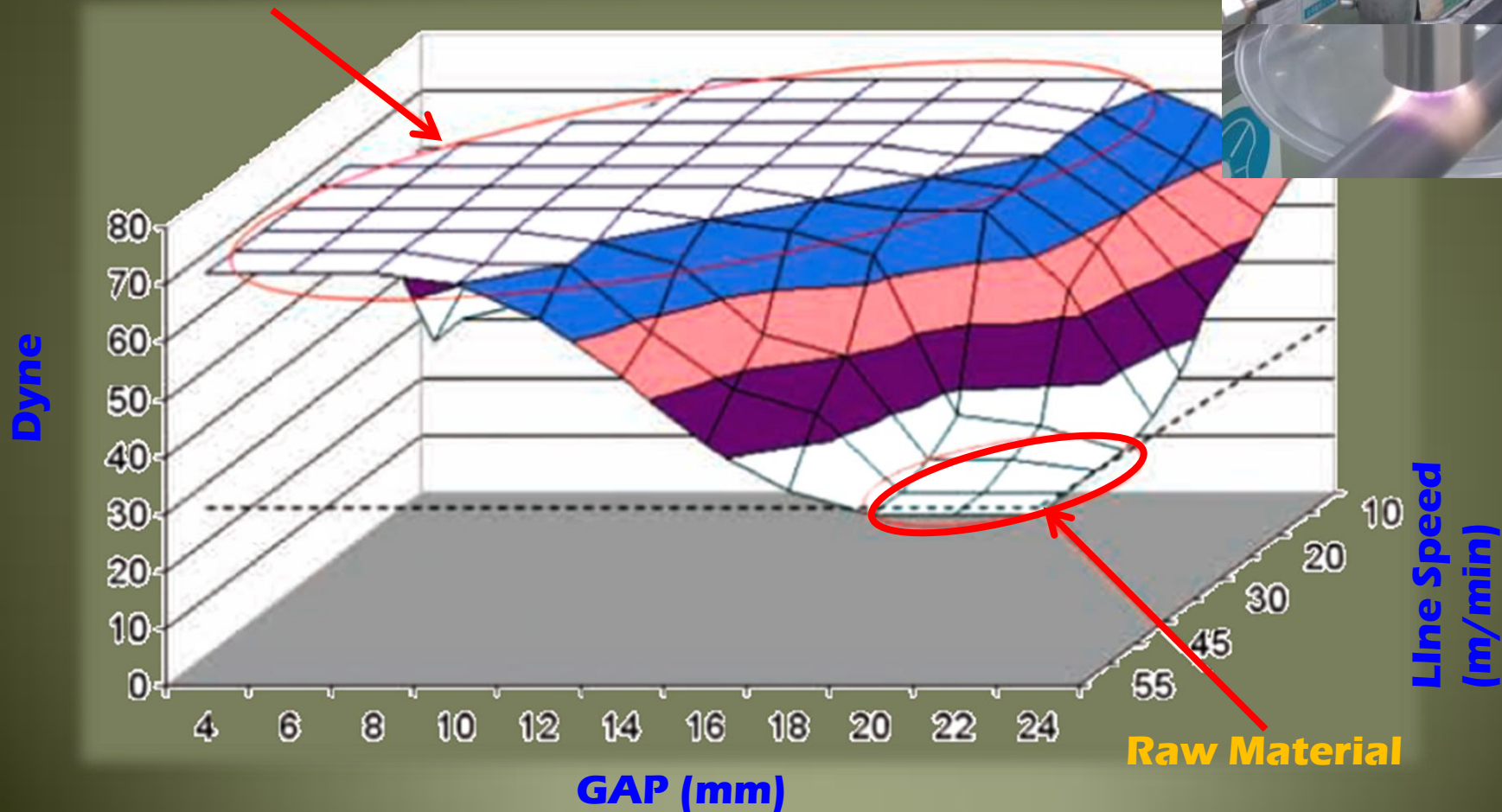


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Surface Energy

Organic Compound

Optimal

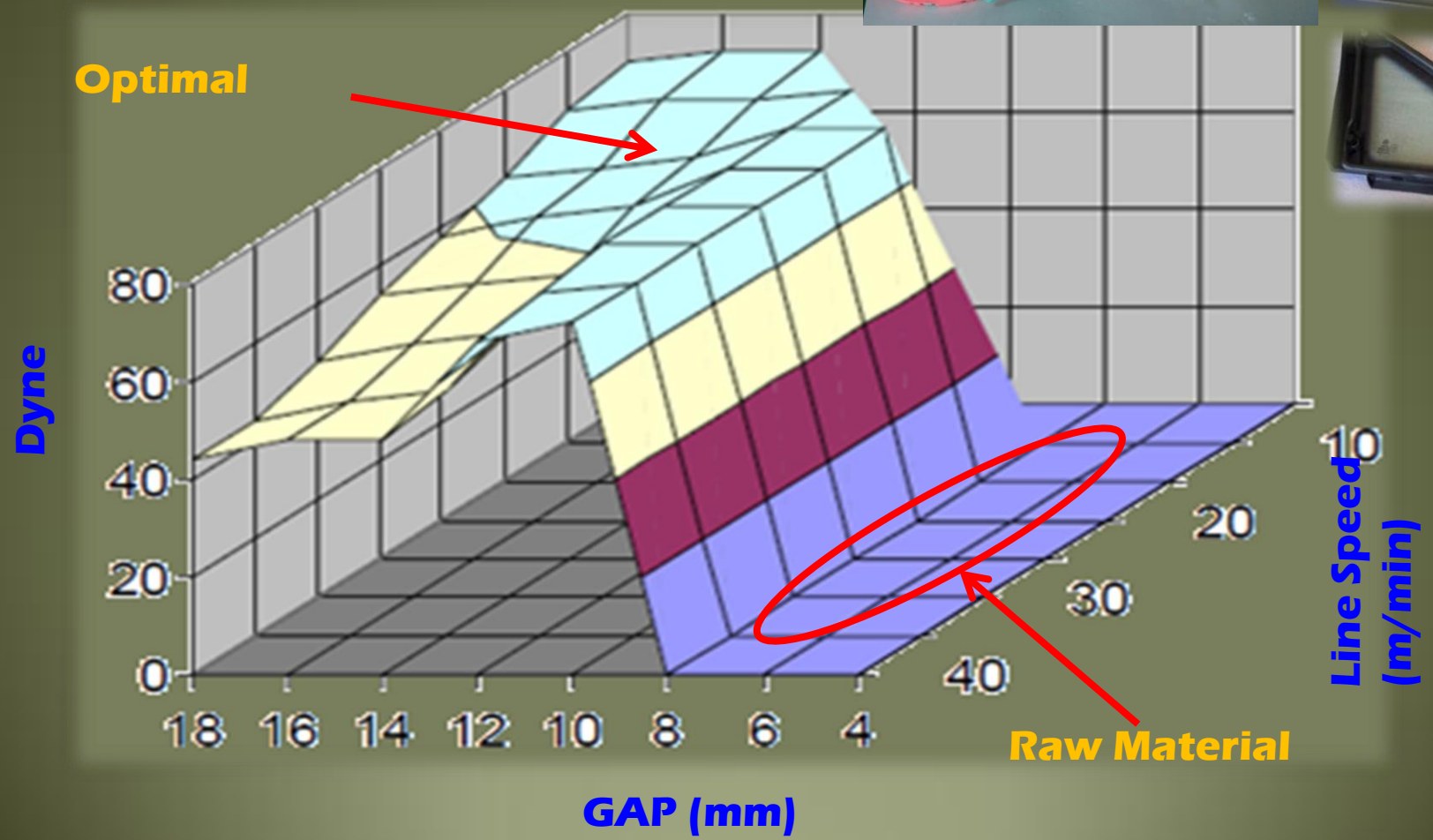


Surface Energy

TPE



Optimal

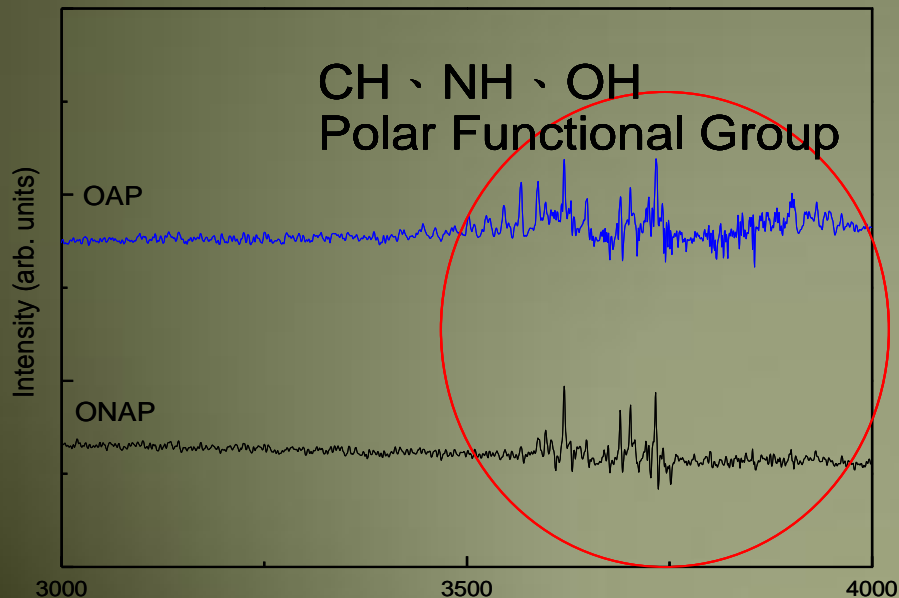
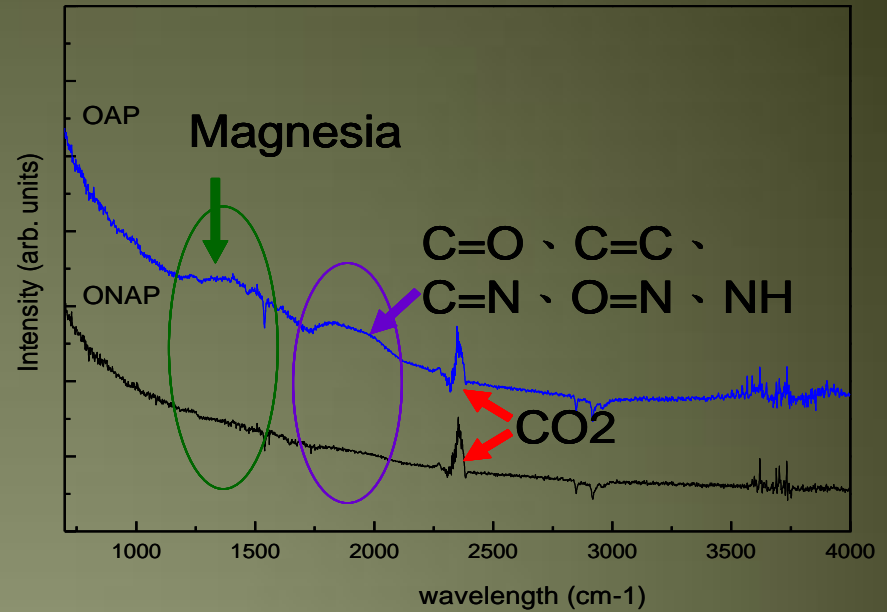


Raw Material

Modification

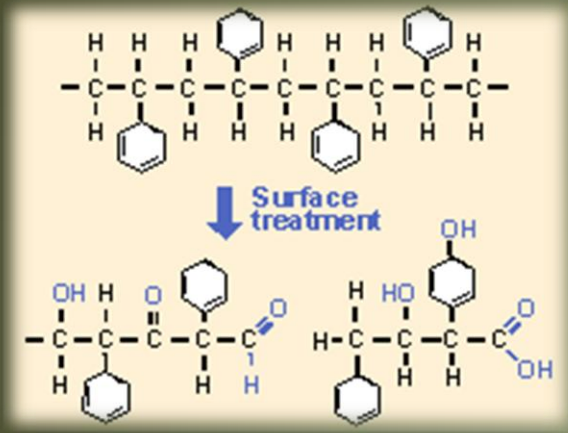
Metal (Al/Mg)

No Chemical Solution
No Wet Process
Air only

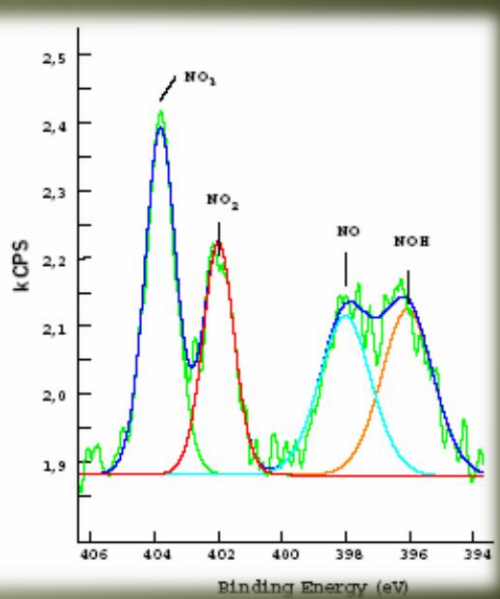
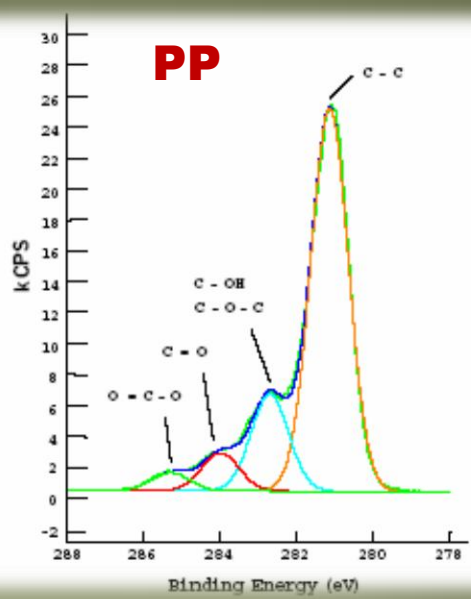
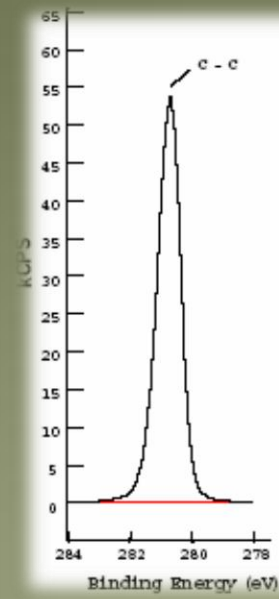


FTIR

Chemical Change Surface Modification



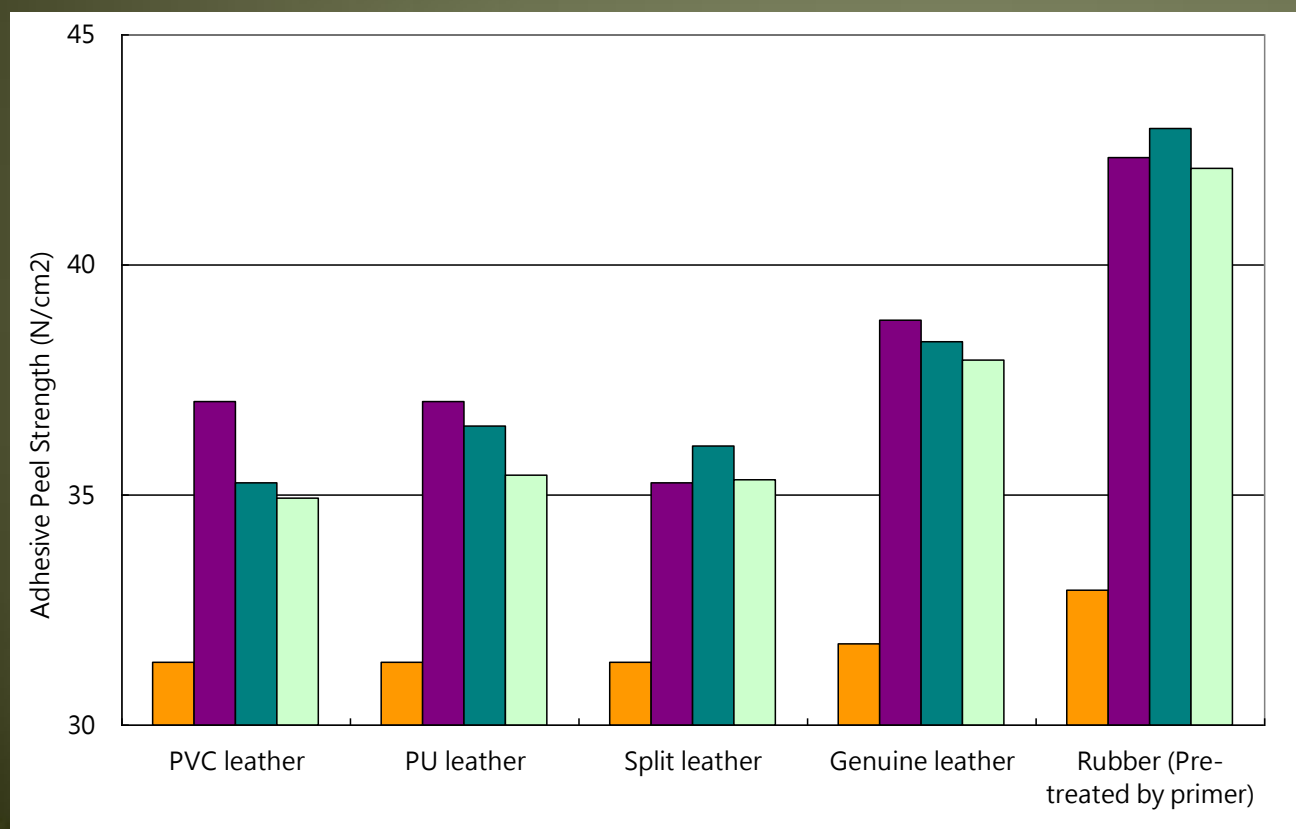
↑ Functional Groups



Tensile Lap-Shear Strength

Because of Chemical Bonding...

APP pre-treatment is much better than others



EVA & leather pre-treatment

- Not UV primer
- UV primer
- SAP Plasma (directly bonded)
- SAP Plasma (bonded after 1hr WBT)

Water-Based Adhesive without Hardener
 Curing at 80°C x 2 hr

Leather w/o polished



雪曼電漿科技有限公司
SHERMANN'S TECH. Ltd.

AP Plasma

Surface Treatment Solution on the TOP

大氣電漿領導先驅

SAP PLASMA Your Professional Partner

High process reliability:

High cost-effectiveness:

High degree of activation:

Large process window:

Easy to integrate:

Environmentally friendly:



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AP Plasma

Surface Treatment Solution on the TOP

大氣電漿領導先驅

For a Breathable Future

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SAP Plasma**





plasma

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