



POINTED POLE ANODE LAYER ION SOURCE

High Performance Industrial Ion Source

- Patented Pointed Pole Advancement
- High Dynamic Etch Rate
- 10x Reduction in Contamination
- Industrial, High Power Design
- 24-Month Limited Warranty



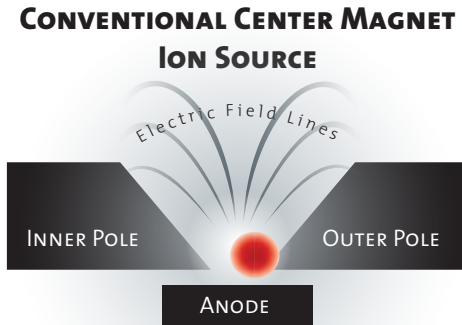
GENERAL PLASMA INC.™

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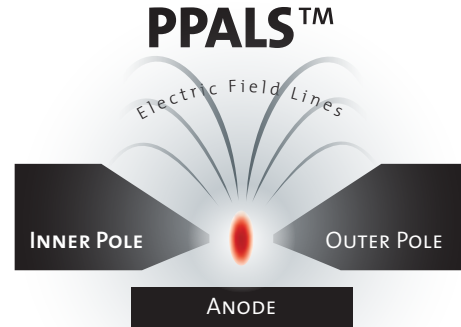
POINTED POLE ADVANCEMENT

Shaped magnetic poles create strong, symmetrical magnetic mirrors that focus electrons into the center of the discharge region. Ion production is advantageously concentrated away from the poles.



ASYMMETRICAL MAGNETIC FIELD

- Plasma **Not** Centered
- **Weak** Mirror Confinement

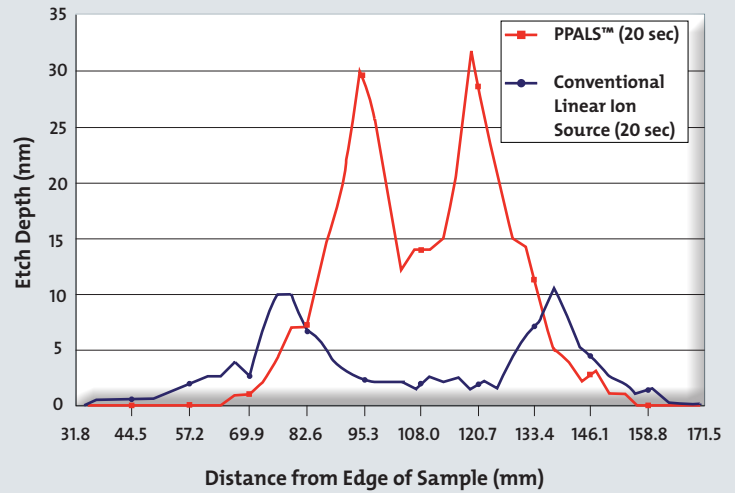


SYMMETRICAL MAGNETIC FIELD

- Plasma **Centered**
- **Strong** Mirror Confinement

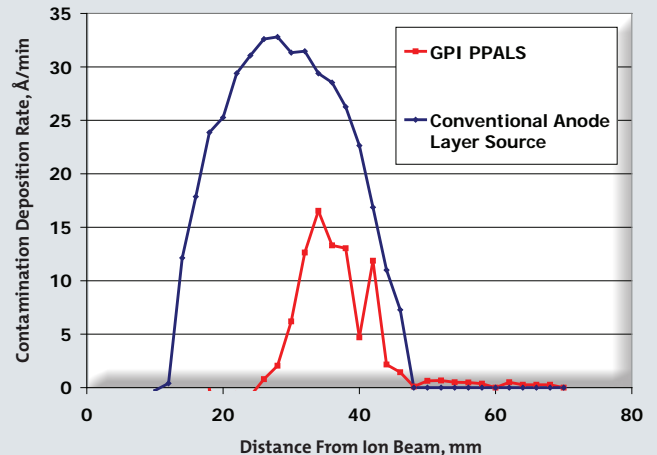
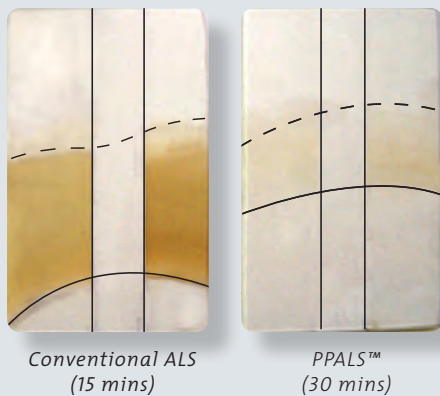
HIGH PERFORMANCE ION BEAM

The highly collimated nature of the PPALS™ beam is evident when compared to a conventional anode layer ion source in a static etch test. Optimized PPALS™ etch rates can reach 30 nm.m/min. Typical maximum etch rates exceed 20 nm.m/min.



10X REDUCTION IN SUBSTRATE CONTAMINATION & POLE SPUTTERING

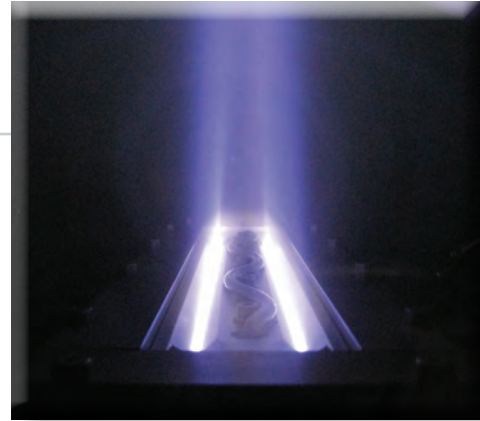
Comparison between conventional, center magnet anode layer ion sources and PPALS™ shows a dramatic reduction in pole sputtering with PPALS™



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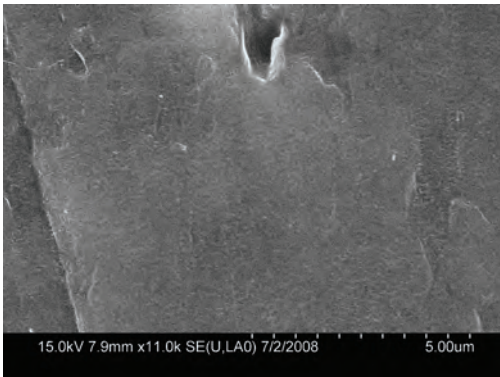
TYPICAL APPLICATIONS

- REMOVAL OF SURFACE CONTAMINATES
- ETCHING OF SURFACE COATINGS OR BULK SUBSTRATES
- ADHESION PROMOTION
- REMOVAL OF SURFACE OXIDES

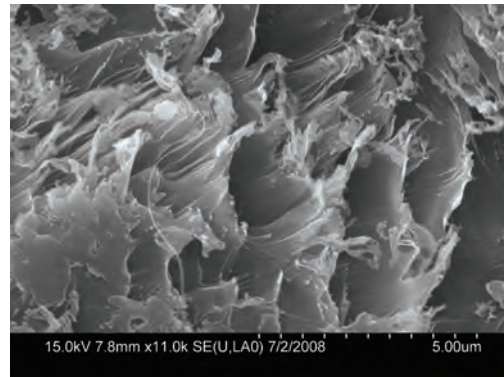


EXAMPLE

Adhesion promotion – Surface roughness can be increased to promote adhesion by increasing the number of dangling bonds. These SEM images show the surface of PTFE substrates before and after ion treatment with an oxygen and argon mixture. Note the increased surface roughness of the treated sample (below right).

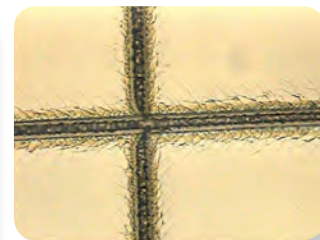
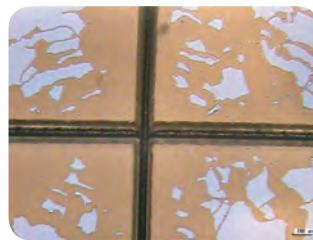


Untreated PTFE substrate surface at 11000x magnification

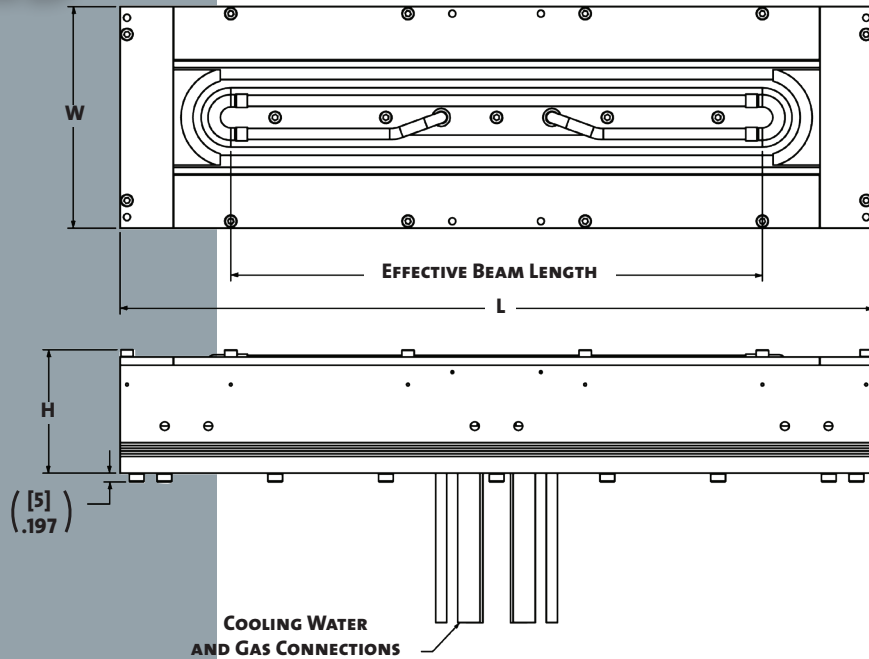


PPALS treated PTFE substrate surface at 11000x magnification

The increased adhesion properties can be seen in these microscope observations of ITO coatings on untreated and PPALS™ treated optical film (Polyolefin).



PPALS™



PRODUCT SIZES & SPECIFICATIONS

	PPALS30	PPALS36	PPALS56	PPALS81	PPALS112	PPALS142	PPALS203	PPALS304	PPALS325
HEIGHT (H)	7.1 cm (2.79")			8.0 cm (3.17")			8.5 cm (3.35")		
WIDTH (W)	12.7 cm (5")								
LENGTH (L)	43.2 cm (17")	48.7 cm (19")	68.7 cm (27")	93.7 cm (37")	124.7 cm (49")	154.7 cm (61")	215.7 cm (85")	316.7 cm (125")	337.7 cm (133")
EFFECTIVE BEAM LENGTH (MAX SUBSTRATE SIZE)	30.5 cm (12")	36 cm (14")	56 cm (22")	81 cm (32")	112 cm (44")	142 cm (56")	203 cm (80")	304 cm (120")	325 cm (128")
UNIFORMITY	+/- 2.5% OVER RECOMMENDED SUBSTRATE WIDTH (EFFECTIVE BEAM LENGTH - 4 CM)								
ION ENERGY	1500 TO 2500 eV								
OPERATING PRESSURE*	< 1.3 x 10 ⁻³ MBAR (< 1 mTORR)								
GAS FLOW*	10-60 sccm	10-100 sccm	10-150 sccm	10-200 sccm	10-250 sccm	10-300 sccm	10-350 sccm	10-450 sccm	10-500 sccm
WATER	≥ 1.0 GPM ≥ 4 LPM		≥ 1.2 GPM ≥ 4.5 LPM	≥ 2 GPM ≥ 7.5 LPM	≥ 3.4 GPM ≥ 12.75 LPM	≥ 4.1 GPM ≥ 15.5 LPM	≥ 5.1 GPM ≥ 19 LPM	≥ 6.1 GPM ≥ 23 LPM	
DISCHARGE VOLTAGE	600 TO 4000 VDC								
MAX DISCHARGE POWER	2.5 kW	2.5 kW	2.5 kW	4 kW	4 kW	8 kW	8 kW	14 kW	14 kW
MOUNTING OPTIONS	FLANGE OR REMOTE MOUNT OPTIONS AVAILABLE								
POWER SUPPLY SPECIFICATIONS									
MAXIMUM POWER	3 kW			5 kW		10 kW		16 kW	
INPUT VOLTAGE	SINGLE-PHASE, 198-264 V RMS, 48-63 HZ INPUT				THREE-PHASE, 187-242 V RMS, 48 - 63 HZ INPUT				
OUTPUT VOLTAGE	4000 V MAX								
INPUT CURRENT	< 16 A AT 220 V			< 20 A PER PHASE		< 45 A PER PHASE		< 70 A PER PHASE	
POWER SUPPLY SIZE	177MM x 483MM x 508MM (7.0" x 19.0" x 20.0")			266MM x 483MM x 610MM (10.5" x 19.0" x 24.0")		222MM x 483MM x 610MM (8.7" x 19.0" x 24.0")		889MM x 483MM x 610MM (35.0" x 19.0" x 24.0")	
INTERFACES	FRONT PANEL, REMOTE CONTROL VIA TERMINAL BLOCK. OPTIONAL SERIAL COMMUNICATIONS ALSO AVAILABLE								

FOR INQUIRIES, PLEASE CONTACT:

*Specified using oxygen

All dimensions are approximate and subject to change.



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General Plasma is an innovation leader in vacuum thin film coating. GPI's patented and patent pending plasma inventions provide superior performance for applications such as solar energy, architectural glass, data storage and scientific research.

Contact GPI for your ion source and sputter magnetron solutions today!