

# Plasma Processes for Compound Semiconductors

SPTS Technologies is an industry-leading supplier of etch and deposition equipment for the manufacturing of compound semiconductor devices for RF, power and optoelectronic applications.

We offer production-proven processes:

- 8 of the Top 10 III-V IDMs use SPTS systems
- 4 of the Top 5 III-V foundries use SPTS systems
- 2 of the Top 5 HB-LED IDMs use SPTS systems

Our global network of sales and service offices provides world-class local support to all our customers throughout Asia, North America and Europe.

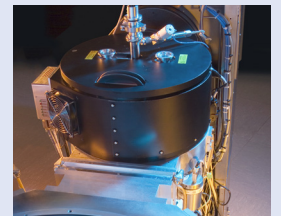
Typical applications of SPTS's processes include high rate backside via etch, low damage frontside etch, high aspect ratio silicon trench etch, and deposition of metal or dielectric layers for stress control, electrical contacts, via seed layers, passivation or anti-reflective coatings.

SPTS is a key partner in CS Connected, the world's first compound semiconductor cluster, which represents organisations associated with research, development and manufacturing of compound semiconductors, with the aim to promote collaborative development for the advancement of compound semiconductor expertise, technologies and products.

## SPTS PRODUCTS

### Omega® ICP

Module for etching a wide variety of compound semiconductor materials, such as GaAs, InP, SiNx, and GaN.



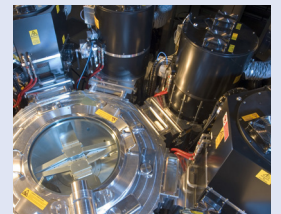
### Omega® Synapse

Module with 10x ion density of ICP, designed to etch strongly bonded materials such as SiC, GaN and sapphire.



### Omega® DSi-v / Rapier

Established high rate silicon DRIE modules with unique end-point solutions.



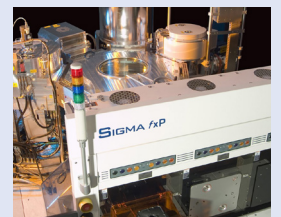
### Delta® PECVD

Deposition of low damage, stress-controlled SiO<sub>x</sub> and SiN layers with unparalleled uniformity and deposition temperatures <250°C.

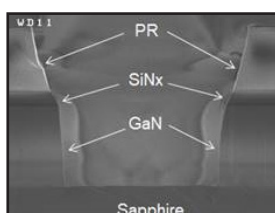
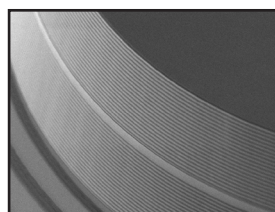
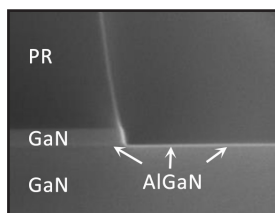
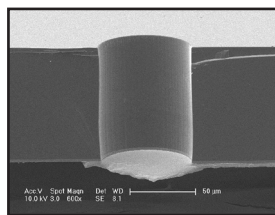


### Sigma® PVD

High productivity metal layer deposition, with excellent film uniformity, for frontside and backside applications.



# Etch Processes for Compound Semiconductors



Device Technology	Substrate	Etch Layers	Requirements
<b>RF Devices</b>			
GaAs	GaAs	Mesa, backside via, SiN <sub>x</sub> , BCB/PI	Field proven processes
InP	InP	InP	High InP via etch rate
GaN on SiC	SiC	SiC backside via GaN	High rate SiC via GaN base layer
<b>Power Devices</b>			
GaN on Si	Si	GaN epi Si backside via	Slow, controllable, low damage epi etch High rate Si TSV
SiC	SiC	Oxide SiC	Profile control No microtrenching
<b>Optoelectronics</b>			
VCSELs	GaAs	Epi stack SiN	Profile, smoothness, end-point
High Brightness LEDs	Sapphire, Ge, Si	GaN Oxide	High rate, profile & high MTBC
InP Communications	InP	InP, InGaAs, InGaAsP	Profile control & smoothness

# Deposition Processes for Compound Semiconductors

SPTS offers PECVD and PVD deposition process modules which are compatible with handling smaller and often fragile wafers commonly used in the compound semiconductor industry - down to 3" for PECVD and 4" for PVD. Our processes offer films with excellent stress and uniformity control, on reliable, high throughput, production-proven Sigma® and Delta® cluster platforms.

## Delta® PECVD

SPTS has the largest PECVD installed base in high volume manufacturing of MIMCAP (metal-insulator-metal capacitors) insulators and other passivation layers in GaAs RF-ICs. Delta® PECVD offers excellent SiN reliability for MIMCAP insulation with a WIW thickness uniformity 2x better than competing systems. We are also the only supplier to offer remote plasma clean for wafer sizes smaller than 200mm, to increase productivity and reduce chamber damage during cleans.

## Sigma® PVD

SPTS has a wide range of PVD module technologies to meet the demands of compound RF-IC and MMIC manufacturing. Typical applications include frontside Au interconnects, thin film resistors, backside via seed, RDL/UBM, BAW electrodes & piezoelectric layers, and SAW electrode & encapsulation. Our Sigma® PVD system includes a unique electrostatic clamp which is compatible with sapphire carriers, without the need for a back-coat of metal.

**SPTS Technologies, and Orbotech company**, designs, manufactures, sells, and supports etch, PVD, MVD® and CVD wafer processing solutions for the MEMS, advanced packaging, LED, high speed RF on GaAs, and power management device markets. For more information about SPTS Technologies, email [enquiries@spts.com](mailto:enquiries@spts.com) or visit [www.spts.com](http://www.spts.com)