

▶ **NANO CARBON SYSTEM**

The NCS 3-150 is a revolutionary new MW Plasma CVD deposition system for low temperature growth of diamond and graphene based films. This system enables poly crystalline diamond compatible thin film growth over a very broad range of materials for device integration, biocompatible coatings and other advanced applications.

The system specifically enables the separate control of substrate temperature and plasma temperature/density.

The NCS 3-150 incorporates diffuse, low pressure pulsed plasma technology for high quality diamond film growth at temperatures <450°C with high growth rates and true scalability for large area uniform films in R&D and production processes.

NCS 3-150 accommodates circular substrates up to 150 mm (6 inches) in diameter which are loaded/unloaded manually. An integrated PLC enables stable long term operation with monitoring of system parameters and safety.

▶ **DIA/CARBON FILM SYNTHESIS**

Nanocrystalline

Microcrystalline

Homoepitaxial

Doped films

Hydrogenation

Oxidation

Graphene

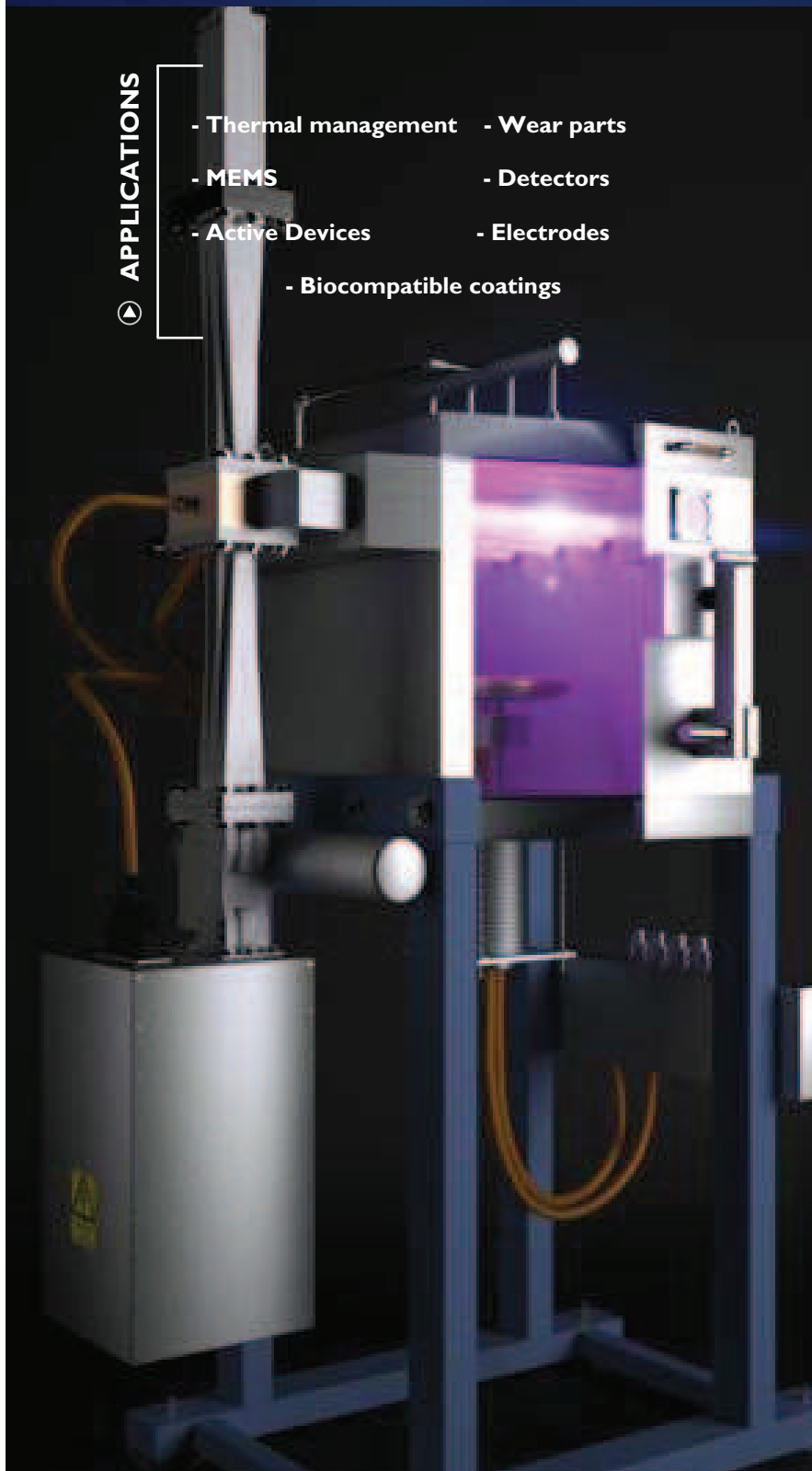


SEKI DIAMOND
S Y S T E M S

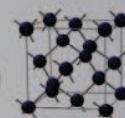
▶ **NCS 3-150**

▶ **APPLICATIONS**

- Thermal management
- MEMS
- Active Devices
- Wear parts
- Detectors
- Electrodes
- Biocompatible coatings



NANO6
ADVANCING NANO CARBON

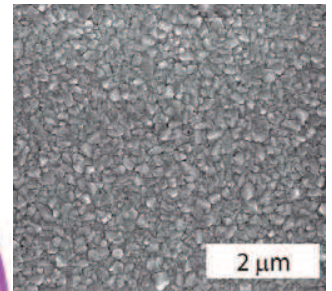
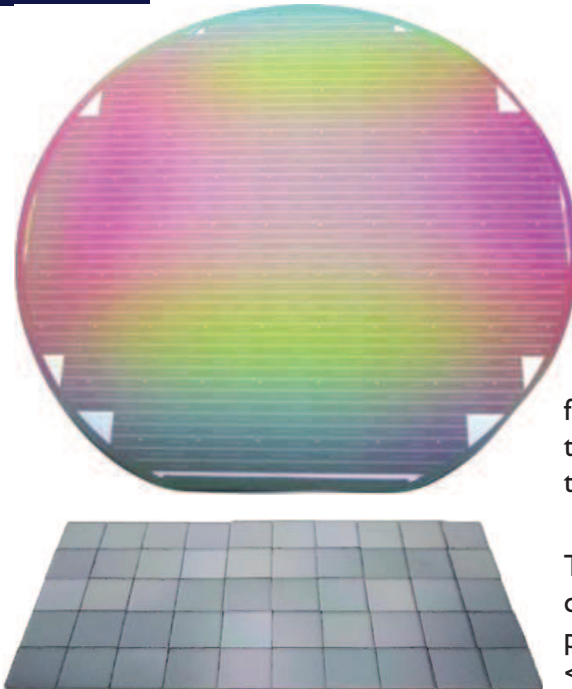


Applications

Low temperature deposition

Low temperature deposition of nanocrystalline diamond (NCD) layers with:

- High sp^3 content
- Over large areas > 6inch
- Wafer bow less than $20\mu m$



SEM image

NCD coated 6 inch wafer with Al & Si_3N_4 pattern prepared at temperatures $< 450^\circ C$

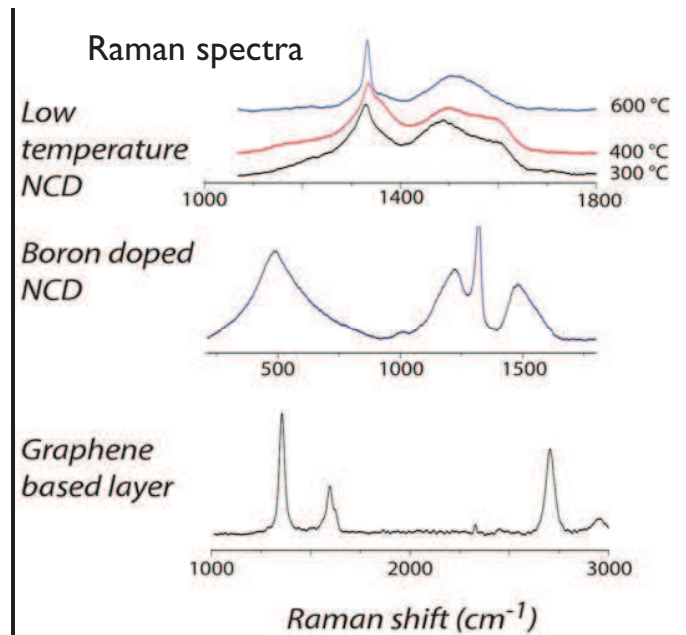
Transparent boron doped conductive NCD layers prepared at temperatures $< 600^\circ C$ on glass

Boron doped NCD

- Suitable for electrochemical applications
- Potential window $> 3.5 eV$
- Large current density
- B doping level $> 2 \cdot 10^{21} cm^{-3}$
- High sp^3 content

Graphene based layer

Growth of transparent ($>90\%$) graphene layers over large areas at low deposition temperatures is enabled due to NCS3-150's unique plasma conditions (combination of low electron energies ($1.5eV$), high plasma densities ($>10^{11} /cm^3$) and low power density).



Technical specification

Substrate table	Active heating and cooling	Microwave power	3 kW average/10 kW peak power
View and diagnostic Ports	2 viewports from above 2 viewports at substrate level 2 inclined viewports to share Common focus on substrate	Typical operating pressure	5 Pa - 300 Pa
		Base pressure	0.8 Pa



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