

▶ Nano Crystalline Systems

▶ NANO CARBON SYSTEM

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

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

The NCS series incorporates diffuse, low pressure pulsed plasma technology for high quality diamond film growth at temperatures <math><450^{\circ}\text{C}</math> with high growth rates and true scalability for large area uniform films in R&D and production processes.

NCS systems can be used for static or dynamic coating of substrates up to a coating width of 800 mm . An integrated PLC enables stable long term operation with monitoring of system parameters and safety.

APPLICATIONS

- Biocompatible Coatings
- Heat spreaders
- Electrodes
- Wear parts
- Detectors
- Active Devices
- MEMS



NCS 6-300/500

▶ DIA/CARBON FILM SYNTHESIS

Nanocrystalline

Microcrystalline

Homoepitaxial

Doped films

Hydrogenation

Oxidation

Graphene



SEKI DIAMOND
S Y S T E M S

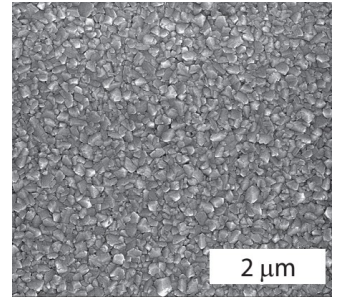
W&L
COATING SYSTEMS

Thin Film Properties

Low temperature deposition

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

- High sp^3 content > 95%
- Over large areas > 6inch
- Wafer bow less than 20 μ m



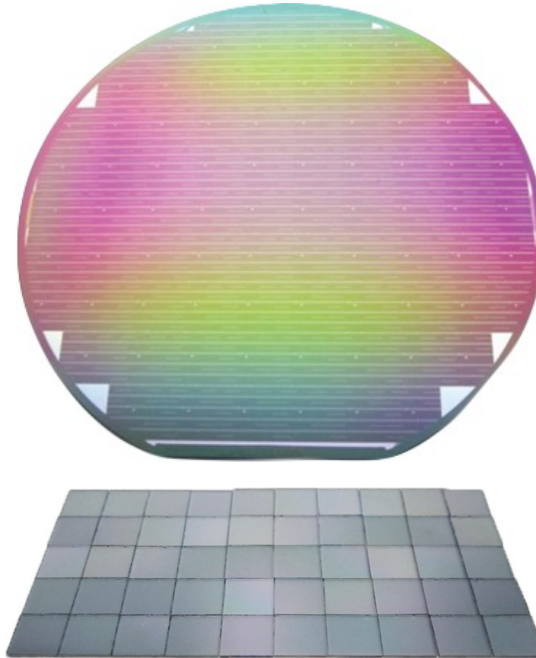
SEM image

NCD coated 6 inch wafer with Al & Si₃N₄ pattern prepared at temperatures <450°C

Boron doped NCD

- Suitable for electrochemical applications
- Potential window > 3.5 eV
- Large current density
- B doping level > 2 · 10²¹ cm⁻³
- High sp^3 content

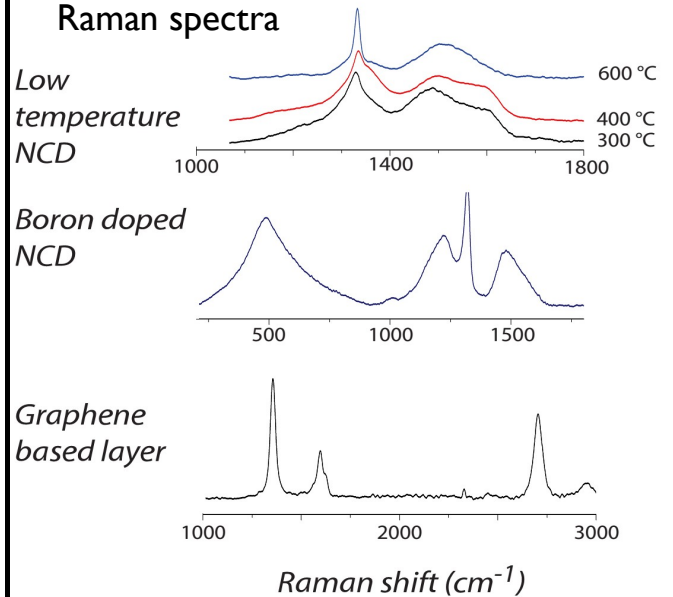
Transparent boron doped conductive NCD layers prepared at temperatures < 600°C on glass



Graphene based layer

Growth of transparent (>90%) graphene layers over large areas at low deposition temperatures is enabled due to NCS unique plasma conditions: combination of low electron energies (1.5eV), high plasma densities (>10¹¹ /cm³) and low power density.

Raman spectra



Technical specification

Vacuum coating system made from aluminum; system dimensions adjusted to size of substrate table

Microwave power: c/w or up to 20 kHz pulse frequency

Substrate table (heated or cooled) dimensions range from 4 Inch circular (turntable) to 800 mm by 1.000 mm (static mode) to 800 mm coating width with continuous substrate flow (dynamic mode)

Typical operating pressure

5 Pa - 300 Pa

Base pressure

0.8 Pa



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