

neoDiam® on wafers

Features and descriptions

neoDiam® coating on flat 2D substrates are used for polishing, electrodes et thermal management applications

CVD diamond coatings on wafers and 2D substrates

NeoCoat offers a high-quality diamond coatings on Si or SiC wafers and similar 2D substrates to produce high-performance diamond coated parts. neoDiam® coatings consist of a diamond film grown on one or both wafer faces.

neoDiam® for thermal management

Thanks to their extremely high thermal conductivity neoDiam® coatings are very interesting materials to use in electronic applications. Typical thermal conductivity of neoDiam® coating can be up to more than 1500 W/m.K, which is 10 time higher than that of silicon. Coatings up to 30 microns thick (or more) on 300 mm silicon wafers provide excellent heat spreading at the chip level. Putting diamond material, which is a passive heat spreader consuming no power, as close as possible to the heat generating junctions, results in a structure where the thermal conductivity of the diamond layer immediately spreads heat away from the junction and reduces junction temperatures.

neoDiam® for DOS and DOI

Diamond-on-Silicon (DOS) and Diamond-on-Insulator (DOI) are essential new technologies for device manufacturers who are seeking new materials for next generation devices. The benefits of diamond enable many new micro and nanofabrication applications such as MEMS, sensors, microelectrodes, while its thermal conductivity makes it an ideal material for silicon semiconductor devices. DOS and DOI wafers manufactured with neoDiam® coatings are available with various film thicknesses, can have microcrystalline or nanocrystalline structures, and can be doped with various doping levels or undoped.

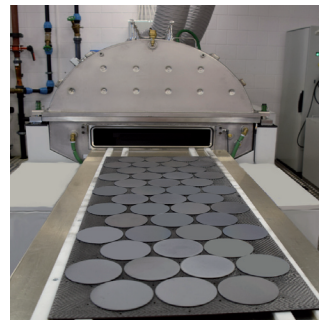
neoDiam® for conditioning pads

neoDiam® diamond coatings are particularly suited for chemical mechanical planarization (CMP) pad conditioning. For such application the hardness of CVD diamond, its low friction coefficient, its abrasion resistance and its excellent thermal properties are unequalled assets. The controlled roughness of diamond coated surfaces is ideal for use in pad conditioning application for silicon wafer manufacturing. All exceptional properties of neoDiam® coatings bring a significantly extend lifetime of the pad conditioner.

neoDiam® production in NeoCoat

With its proprietary CVDiam® hot filament diamond deposition systems, NeoCoat is the only company able to offer uniform deposition of diamond on several large size wafers or plates per batch. CVDiam® reactors are used to produce highly uniform diamond films on silicon wafers ranging from 25mm to 300mm diameters, or on any parts that fits the uniform 1150x400mm deposition area.

As example a high capacity CVDiam® reactor accommodates 42 wafers of 100 mm, 17 wafers or 150mm, 10 wafers of 200 mm or 3 wafers of 300 mm. Produced neoDiam® coatings are of very high quality with a uniformity within +/-5% over the entire wafer surface.



neoDiam® coating data

Thickness	from 0.05 to 100µm
Uniformity	+/- 5%
Microstructure	Microcrystalline (MCD) or nanocrystalline (NCD)
Doping level	From 10 to 10'000ppm boron

Substrate data

Typical data of parts which can be coated with neoDiam®:

Type	Si (mono- or polycrystalline), SiC, Si3N4, etc.
Dimensions	1" to 12" wafers or up to 400x400 squares
Surface patterning	Positive or negative
Possible insulating coating	Si3N4, SiO2/Si3N4, SiC