

Diamond technology

Diamond is the hardest material in nature. Natural or synthetic diamonds have unique mechanical, chemical and electrical properties. NeoCoat SA has focused its research efforts on the HFCVD (Hot Filament Chemical Vapour Deposition), a process first developed in the early 1990's in which diamond synthesis takes places from a gas mixture at high temperature and under vacuum.

Polycrystalline diamond thin films and boron-doped diamond electrodes have outstanding properties.

Material properties

- Extreme hardness (10'000 V_k)
- Outstanding tribological and dry lubricant properties
- Exceptional heat conduction
- Wide range optical transparency
- High chemical stability
- Biocompatibility
- Interferencial colours

Electrochemical properties

- High overpotential at which water is oxidized
- Generation of a mixture of powerful oxidants
- High oxidation potential to reduce organic load (COD) and eliminate all pathogens



Our Company

NeoCoat SA is a high-tech company active in the field of CVD Diamond Technology. Its thin diamond films have various applications and the company focuses its offer on CVD-diamond solutions either coating services or equipments. NeoCoat's headquarter and production facility are located in the Technology Park Neode, in La Chaux-de-Fonds (NE), Switzerland. The company does business worldwide by developing new applications and products with industrial partner and OEM, and by selling components, products, processes and engineered equipments.



Contact us:

NeoCoat SA

Eplatures-Grise 17

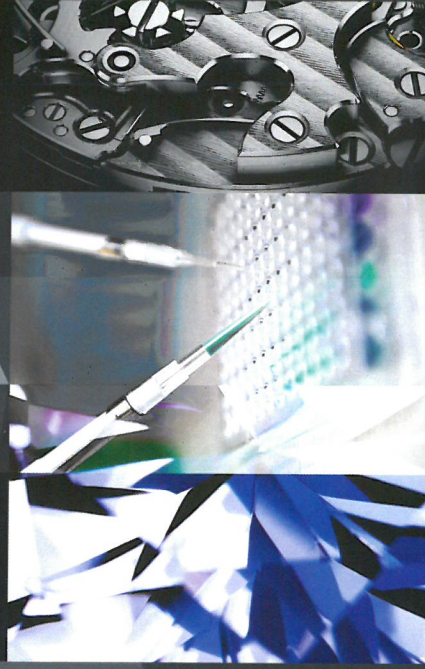
2300 La Chaux-de-Fonds, Switzerland

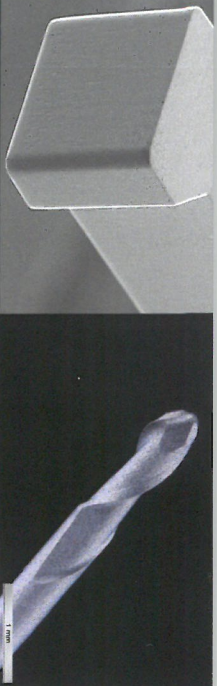
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neoCoat

WE GROW DIAMOND





Diamond coating services

NeoCoat's team has extensive experience in the development and manufacturing of diamond thin films and their high-tech applications.

- NeoCoat's in-house CVDiam[®] reactors have the following characteristics:
- HF reactors with deposition surfaces up to 0.5 m²,
- Production capacity that allows coating a large number of parts (up to several thousands per week depending on part size).
- MW plasma reactor for single crystal or polycrystalline film growth

NeoCoat is able to grown perfectly closed diamond films (from 70nm up to more than mm thick) on flat, complex or microstructured shapes made of various materials such as Si, Si₃N₄, SiC, refractory metals, carbides, oxides (fused silica, alumina), ceramics, etc.

Crystallographic structures of NeoCoat's diamond coatings can be either Nanocrystalline (NCD), Microcrystalline (MCD) or Monocrystalline.

Typical applications and products based on neodiam[™] coatings

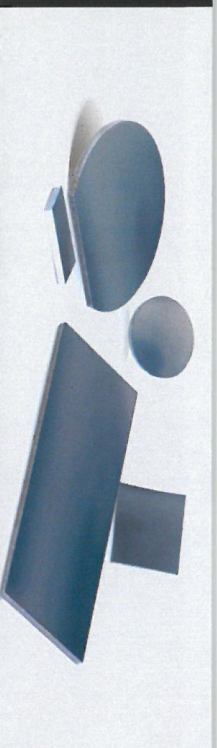
- Diamond coated tools (drill, routers, inserts, etc.)
- Conductive diamond AFM probes
- Diamond coated micromechanical parts
- Diamond coated rotary seals
- Crystalline synthetic diamond parts
- Single crystals of diamond for opto-electronique and jewelry



neodiam[™] Coatings

NeoDiam[™] coating services offer a broad selection of thin film diamond coatings of the highest quality. NeoCoat's coating application expertise and state-of-the-art Quality Control systems (Raman spectroscopy, UV-VIS, reflectometry, tribometer) enables us to work with customers around the world efficiently and coat:

- Thin diamond films on patterned or microstructured substrates
- Microcrystalline diamond films with high sp³ carbon purity and surface roughness closed to those of bulk diamond



neoCoat[®] Electrodes

NeoCoat offers various BDD electrodes, standard or custom ones.

NeoCoat-Electrodes consist in a polycrystalline boron-doped diamond film coated on a substrate, which can be either Silicon, Tantalum or Niobium. Various boron doping levels are available in a doping range of more than 2 orders of magnitude between the less and the more doped.

NeoCoat's standard electrodes:

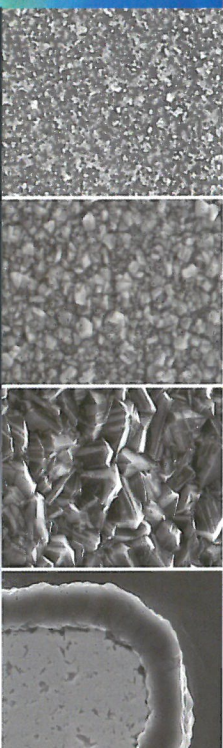
- have simple geometries (discs, squares or rectangles)
- maximum sizes of few hundreds of cm²
- thicknesses in the range of 3 to 5µm

Custom ones can:

- be either very small (few mm²) or very large (up to almost 0.5m²)
- have totally customizable shapes, can be based on rods, grids or meshes
- have thicknesses in the range of 0.1µm to tens of µm
- be based on other substrates than Si, Ta or Nb

Typical applications of NeoCoat-Electrodes

- Destruction of all microorganisms, water disinfection
- Destruction of dissolved organic pollutants
- Post-harvest drenching of fresh produce & recycling in food processing
- CIP- Clean in place, surface disinfection
- Electroanalytical applications, devices and detectors
- Electrochemical synthesis



neoCoat[®] Processes

Thanks to its know-how and technical skills, NeoCoat can develop and optimize specific processes for its partners by using project management standards. Such substrate pretreatments and/or diamond depositions processes are tailored to specific customer applications. These can be:

- Nanoseeding pretreatment on various substrates
- Interface optimization: cleaning, etching, diffusion barriers
- Diamond coating on various substrates and single crystal growth
- Fine tuning of boron doping level
- Various microstructure (single crystal, NCD, MCD, multilayers...)



CVDiam[®] reactors

NeoCoat team benefits from a 20 year experience in developing diamond CVD reactors (large-scale HF/CVD reactors or MW/CVD ones).

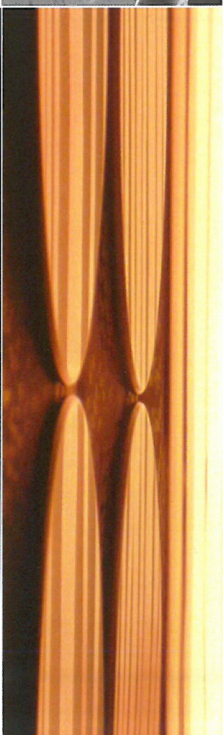
Thanks to its a complete range of fully automated hot-flament or plasma microwave equipments, NeoCoat fulfills all customer needs.

With deposition area of 0.025m², 0.12m², 0.24m², 0.36m² or 0.50m², the 5 reactors that compose CVDiam[®] HF range cover all capacity requirements for lab-scale experiments, R&D projects, industrial applications or mass production.

With its deposition area of 2-3", CVDiam[®] MW6 allows growing multiple single crystals per batch or thick polycrystalline films.

CVDiam[®] equipments are designed to be user-friendly and safe. Following characteristics are part of CVDiam[®] reactors assets:

- Low COO and high-capability processes
- Customizable substrate holders
- Ergonomic design for easy manufacturing & maintenance operations
- High reliability and safety obtained with high-quality components and interlock management
- User-friendly and mass-production designed GUI
- Probably the largest deposition surface on the market!



neoCoat's Global Offer

CVD DIAMOND EXPERTISE

DIAMOND GROWTH – EQUIPMENTS – PROCESSES - CONSULTING

- Consulting and careful evaluation of customer needs
- Extensive experience of CVD diamond growth and applications
- A full range of CVDiam[®] diamond reactors (HF/CVD and MW/CVD)
- Dedicated pretreatment and diamond deposition processes
- Customized process developments
- Close support for installation, qualification and training