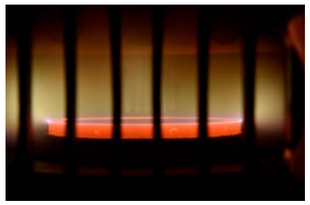
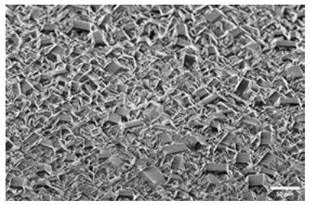
About us

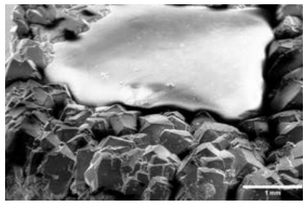
W&L Coating Systems develops, manufactures, and markets components and systems for the coating and treatment of surfaces using vacuum processes. This includes plasma enhanced chemical vapor deposition (PECVD) of organic and ceramic thin films onto various surfaces under production conditions.

The company specializes in microwave based systems and processes for the large area deposition of intrinsic and electrically conductive polycrystalline diamond layers, diamond single crystals and vertical graphene. A particular focus is on the development and production of electrochemical cells with boron doped diamond (BDD) electrodes for wastewater treatment and other applications.

Furthermore, W&L Coating Systems has extensive experience in the deposition of thin metallic and ceramic layers using the magnetron sputtering process with proprietary tubular sputtering cathodes under production conditions, with a particular focus on specialized, material saving solutions for precious metals.







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A member of the SCHNEIDER group

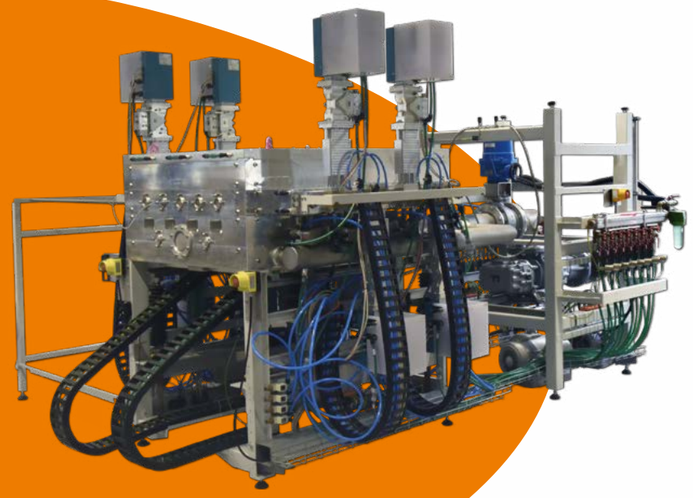
Electrochemical PFAS Removal

W&L
COATING SYSTEMS

Coating in a Plasma Environment

Many plasma coating processes perform best in a vacuum environment. It enables plasma temperatures of several thousand degrees centigrade at moderate and controllable thermal loads on the surfaces to be coated or treated.

Thus, non-equilibrium plasma discharges are ideal for chemical processes such as the formation of diamond in our Plasma Enhanced Chemical Vapor Deposition (PECVD) systems.

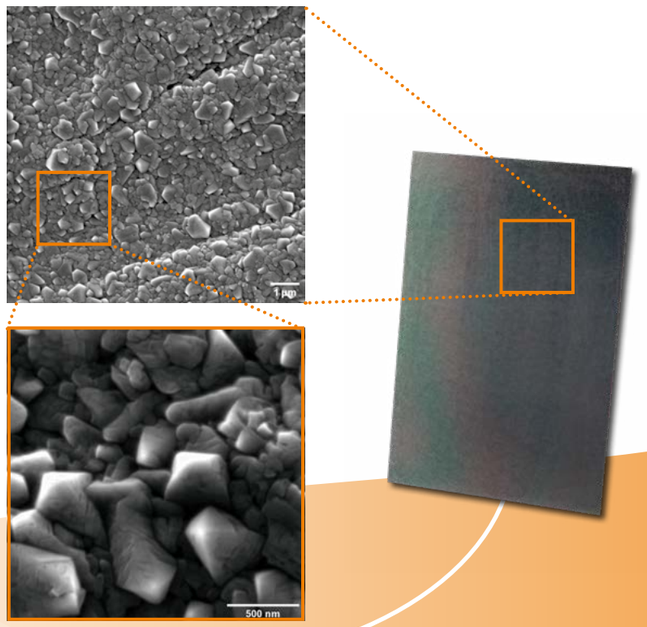


NCS48
Vacuum Plasma System

- PECVD system for the production of electrically conductive nanocrystalline boron-doped diamond (BDD) thin films
- 48 kW of 2.45 GHz microwave power input
- Up to 20 kW of infrared heating
- 400 to 750 °C substrate temperature
- 1000 mm x 620 mm of coating area
- Up to 350 nm h^{-1} deposition rate

BDD Electrode

- Boron-doped diamond (BDD) coated electrode
- Titanium-based electrode substrate
- 300 mm x 200 mm active area
- Thin diamond layer thickness below 5 µm reduces stresses in the film improving service life

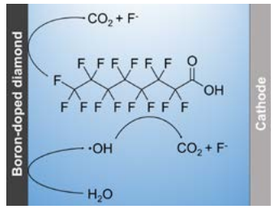


Electrochemical Wastewater Treatment

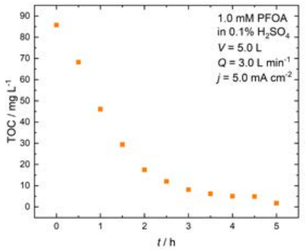
BDD exhibits one of the widest electrochemical potential windows in water, ranging from -1.0 to +2.6 V vs. SHE (Standard Hydrogen Electrode).

This allows for the anodic oxidation of even highly persistent organic pollutants (POPs) such as per- and polyfluoroalkyl substances (PFAS) to CO_2 and inorganic residues.

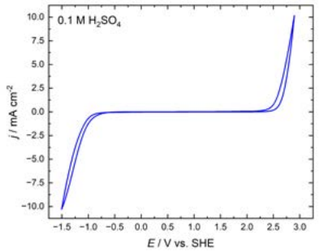
Degradation on the BDD surface is achieved via direct electron transfer (DET) and by water electrolysis, which forms hydroxyl radicals (·OH), the second strongest known oxidizing agent.



Electrochemical Advanced Oxidation Process of PFOA



Total Organic Carbon reduction during PFOA electro-degradation



Cyclic Voltammogram of the BDD electrode

Electrolyzer Stack

- Modular design to accommodate a wide range of pollutant concentrations
- Customizable number of electrodes
- Up to 3 m² of BDD surface area
- Bipolar configuration enables low current and minimizes electrical and thermal losses

Technical Implementation