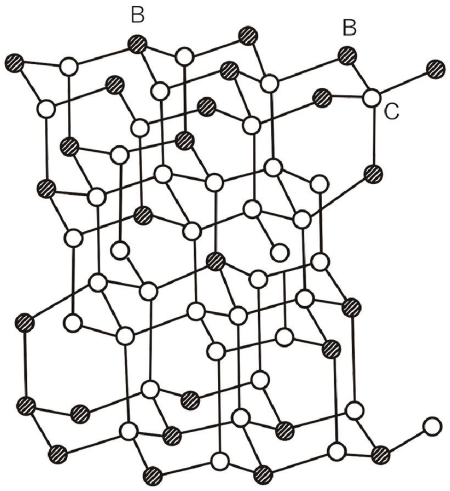
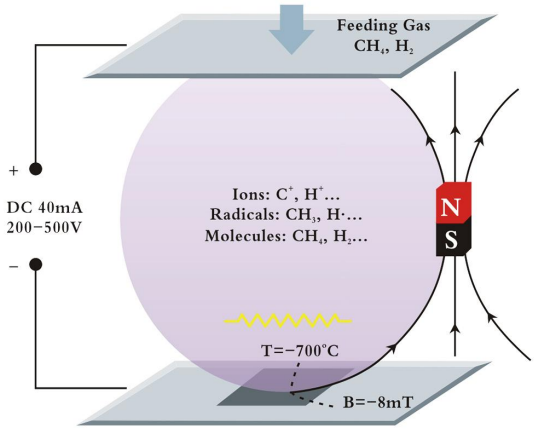
Boron-Doped Diamond Electrode Material



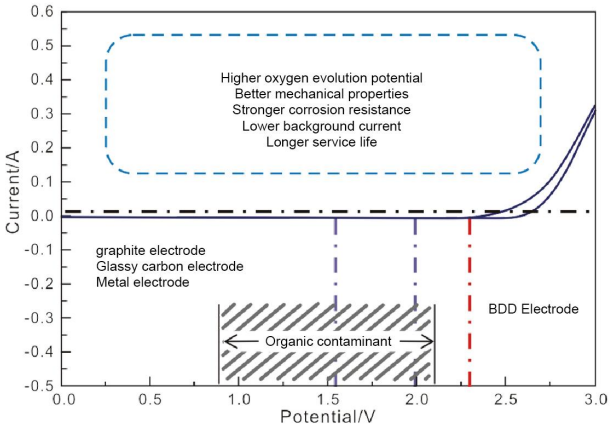
Schematic diagram of boron doped diamond atom model

Diamond has many advantages, such as high hardness,high thermal conductivity, high stability, corrosion resistance and good biocompatibility. Pure diamond does not conduct electricity, while Boron - Doped diamond (BDD) film varies with the amount of BoronIt has the properties of a semiconductor or even a cryogenic superconductor. Boron-doped diamond film has great advantages in the electrochemical field,including wide potential window, low background current,high electrochemical stability and other advantages, which is recognized as the most promising excellent electrochemical electrode materials.

Boromond EPT Co., Ltd. uses self-developed chemical vapor deposition (Chemical Vapor Deposition,CVD) coating the equipment, with boron, carbon gas as the main raw material, in the low pressure furnace body after high temperature dissociation, carbon atoms, boron atoms on the substrate surface deposition into a film, can achieve the mass production of BDD coating.



Schematic diagram of CVD deposition



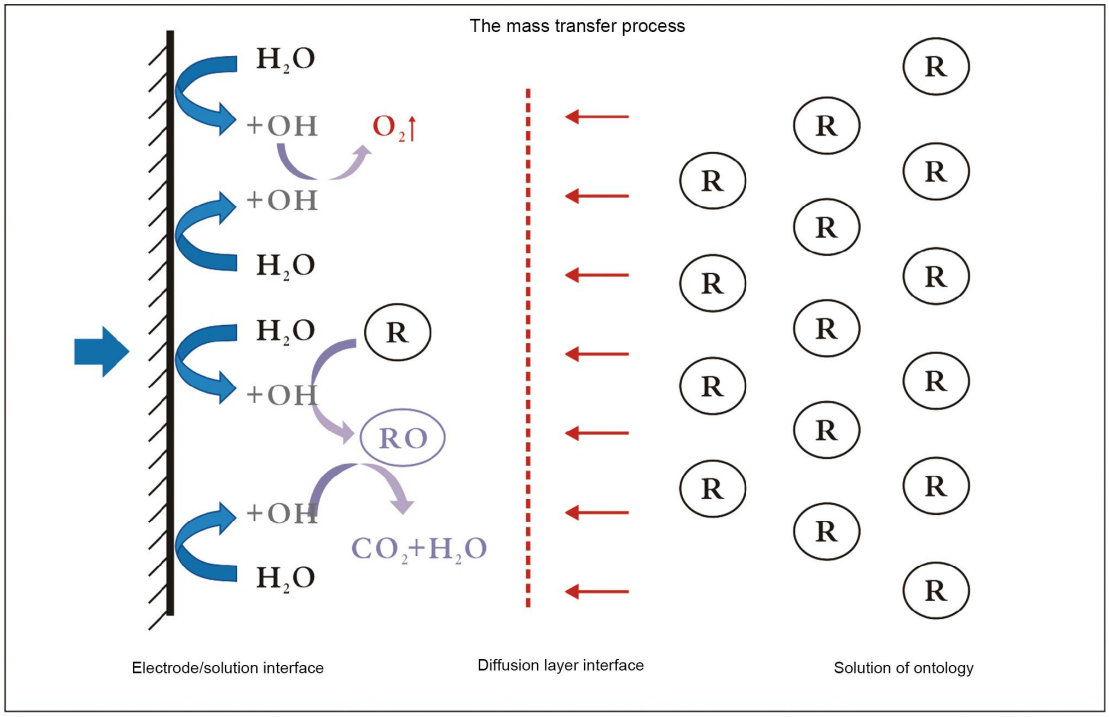
Schematic diagram of the BDD potential window

Electrochemical Oxidation Technique

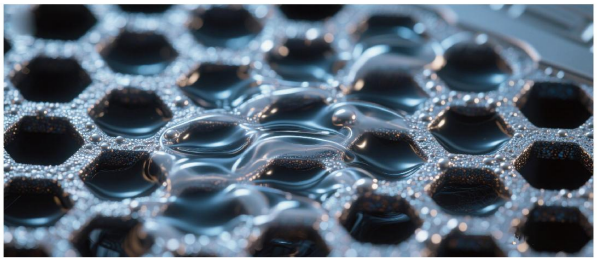
Electrochemical oxidation technology was first introduced in 1970. Due to its green and efficient technical characteristics, it has been widely concerned in the field of sewage treatment and disinfection. By coupling with flocculation, biochemistry, membrane treatment and other technologies, it has outstanding advantages and broad prospects in the field of deep purification and treatment of high-concentration refractory wastewater.

The electrochemical oxidation technology with BDD material as anode can degrade organic compounds including direct oxidation and indirect oxidation. Direct oxidation is the oxidation removal of organic matter by adsorption of organic pollutants on the anode surface in the form of electron transfer. According to the degree of oxidation, it can also be divided into electrochemical Conversion and electrochemical Combustion. Indirect oxidation is the oxidation removal of organic pollutants by producing active intermediates or high oxidizing metal oxides on the anode surface.

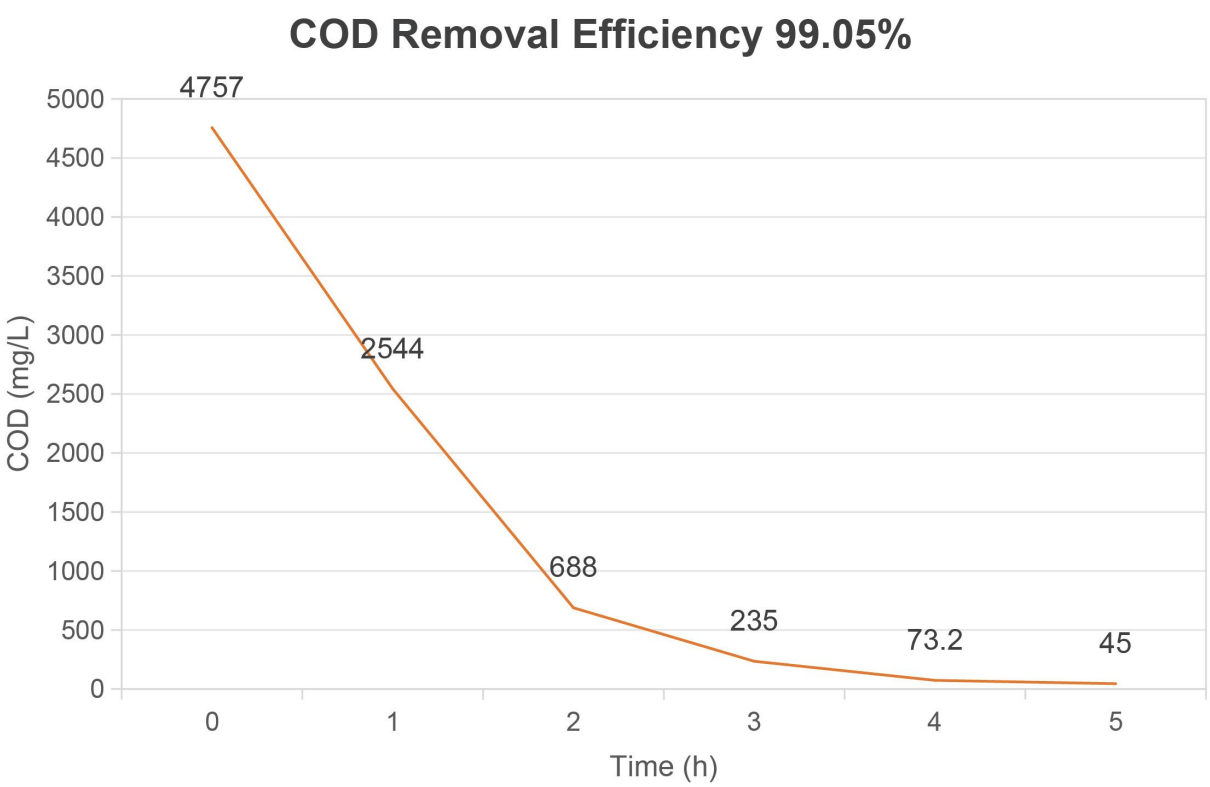
Hunan Boromond EPT Co., Ltd. uses the electrode module based on BDD electrode material as the core, the continuous degradation of organic pollutants can be realized under the condition of normal temperature and pressure without the need to add chemicals, only the power consumption, almost no material consumption, has a significant advantage of simplicity and efficiency.



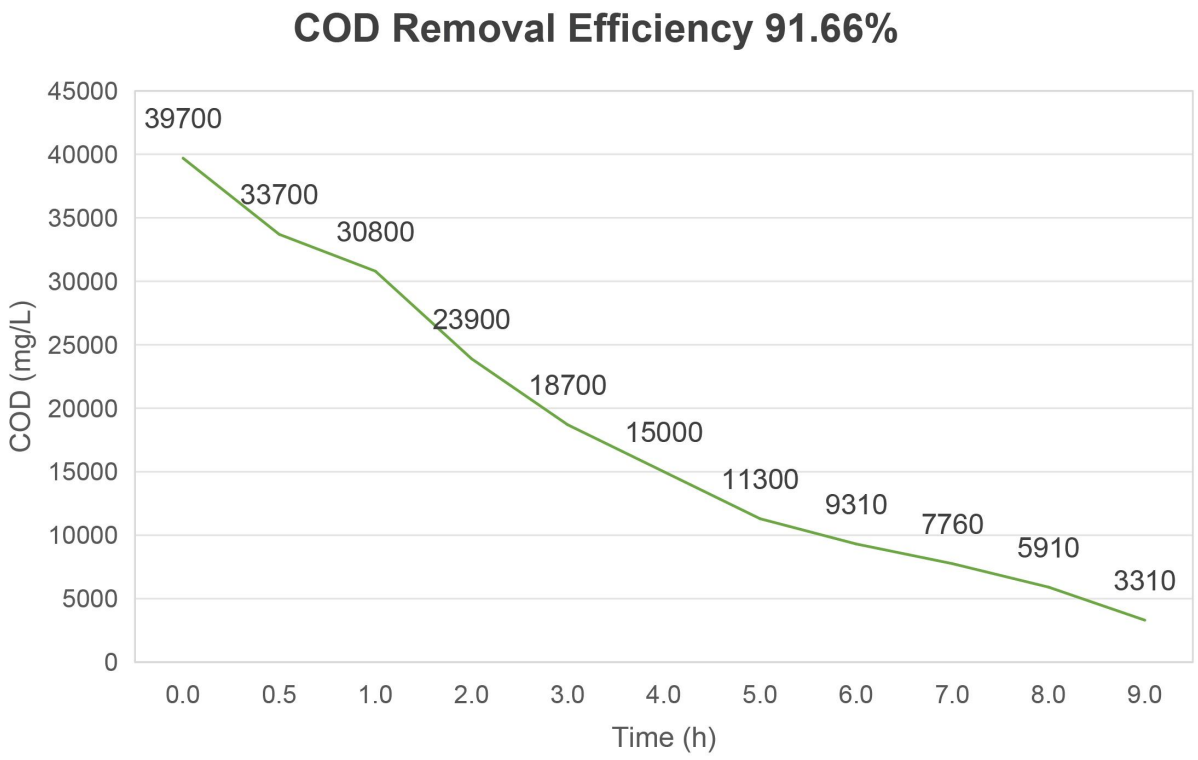
Schematic diagram of electrocatalytic oxidation technology



Case Data Analysis



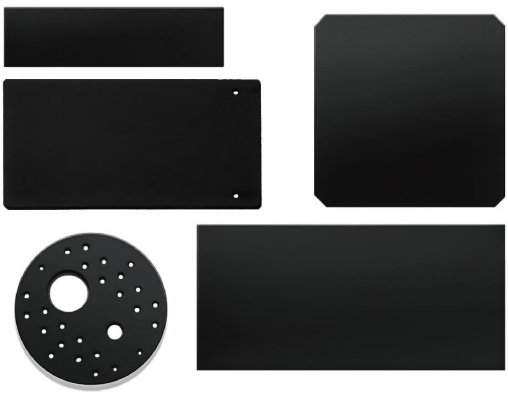
Coking wastewater Project

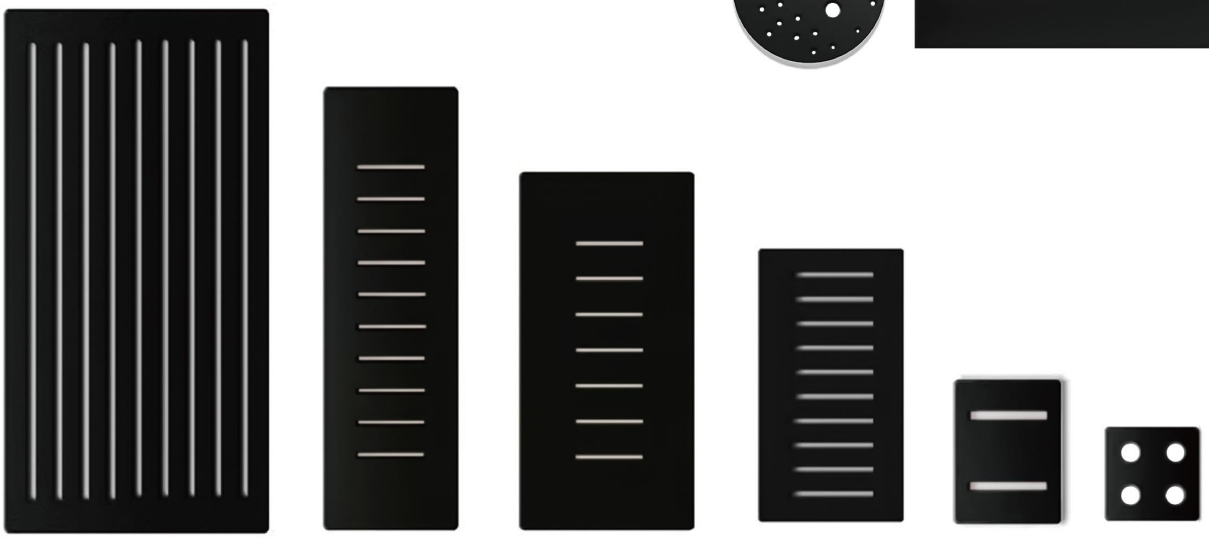


Oil &Gas wastewater Project

BDD Electrodes

Boromond has developed a large range of boron doped diamond (BDD) electrodes on Silicon substrates. In the facility, high quality diamond coatings are deposited on large-scale in HFCVD reactors. To ensure customer's satisfaction with the highest quality diamond coatings, Boromond has implemented a strong Quality Assurance policy to guarantee customer satisfaction.Electrode specifications are systemically controlled through Bormond's advanced metrology equipments.





- Strong acid and alkali corrosion resistance;
- Excellent adsorption resistance;
- No passivation layer;
- Stable in harsh electrolysis,high temperatures;
- Widest electrochemical window;
- High oxygen evolution potential;
- Excellent mechanical properties;
- Low hydrogen evolution potential;
- Low background current;

Specifications

Substrate	Silicon/Nb	Operation Conditions	Anode/Cathode/Bipolar
Electrode Shape	Rectangle/Disk/Mesh/Foam/Custom	**BDD Resistivity**	10-1000mΩ·cm
BDD Coating Thickness	<10 um	**Oxygen Potential**	2.5-2.9V
Coating Side	Single side/ Double sides	**Current Density**	<100 mA/cm^2
Substrate Thickness	0.5-10 mm	**Hydrogen Potential**	≧-1.2 V
Electrode Dimensions	5*5mm~ 500*500mm	**PotentialWindow**	≦3.85 V
Grain Size	<2 um	**Stability**	stable in harsh media (strong acids,alkaline, alcohols,oils,complexing agents,aromatics), high temperatures,hetergeneous media,etc.
Boron Concentration	5000-6000 ppm		

Application Range