


PRISTINE
DIAMONDS PVT. LTD.

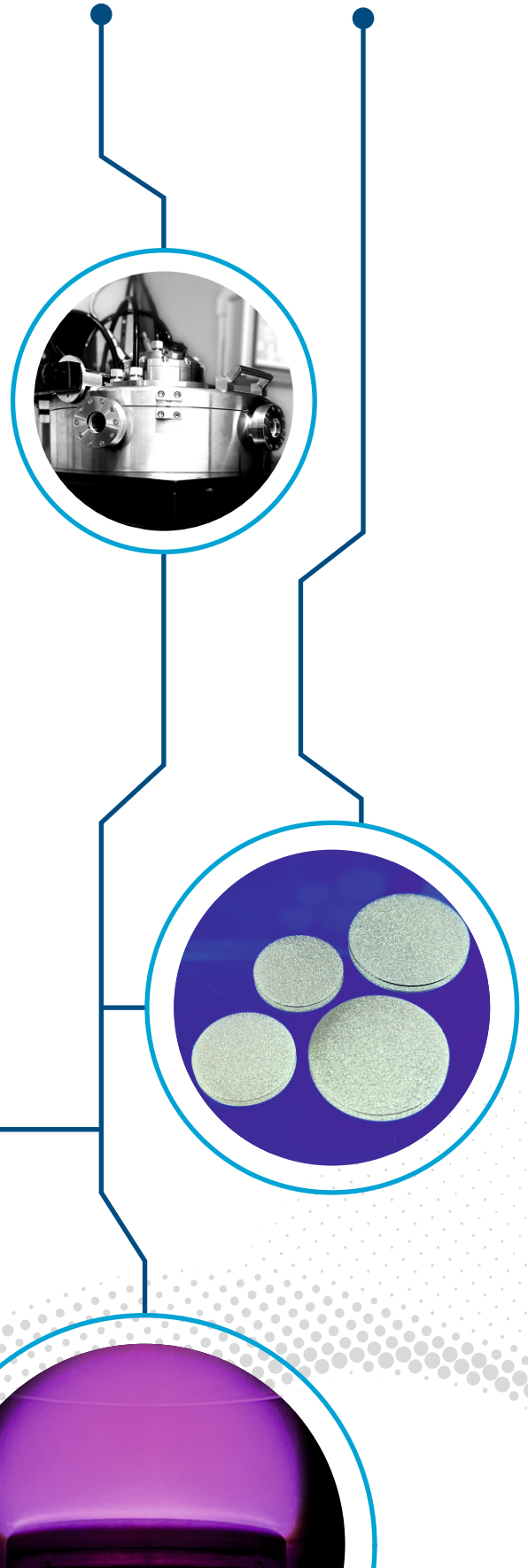
ABOUT US

Pristine diamonds is specialized in manufacturing of exclusive Microwave Plasma Chemical Vapor Deposition (MPCVD) systems that offers its customers a variety of customization options with strong technical support to experience a flawless process of growing the most adamas element on earth. We have developed a complete know-how process to grow application oriented mono- and polycrystalline diamonds that covers substrate pretreatments, fully-automated deposition process, and post-deposition procedures.

We are engaged in continuous innovative research and offers a variety of diamond based products for their use in high-end applications.

OUR VISION

We aim to harness the exceptional properties of diamonds to usher into a new class of innovative materials for technological upgrading. Our expertise in manufacturing CVD-diamond products permits us to materialize innovative applications across the industrial spectrum.



OUR SERVICES



Supply of advanced 6/12 kW MPCVD systems with preloaded recipes to grow high-quality single crystal diamonds (SCDs).



Providing technical assistance in setting up facility to install MPCVD systems.



Training collaborator's personnel and providing operational know-how & SOPs.



Supplier of single & poly-crystalline diamonds with tailored features & dimensions for next-gen applications.



Technical alternatives of ultra high vacuum chamber/incorporation of corrosive gases for semiconducting industries.

SYSTEM SPECIFICATIONS

1

CHAMBER & SUBSTRATE HOLDER SPECIFICATIONS

Chamber Material	Stainless Steel
Chamber Lifting Arrangement	Automated with 45° lid Rotation Facility
Stage Material	Molybdenum & Copper
Z-Axis Movement	High-Precision Water-cooled Moving Stage
Moving Stage Diameter (6/12kW)	65/80 mm
Operating Pressure	20-250 Torr
Process Temperature Monitoring	IR Pyrometer; 350-1800°C

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SOFTWARE & ELECTRONICS

Software	Fully automated with single-push operations
Interface	15" HMI

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VACUUM SYSTEM SPECIFICATIONS

Primary Pump; Pumping Speed	Rotary Vane Pump (RVP); 25 m ³ /hr
HV Pump; Pumping Speed (Optional)	Turbo Molecular Pump (TMP); 67 l/s for N ₂
Dry Pump (Optional)	Scroll Pump, 12/15/18 m ³ /hr
Vacuum Guage	Atm. to 10 ⁻⁴ Torr
Vacuum Guage (Optional)	Atm. to 10 ⁻⁹ Torr
Ultimate Pressure (RVP)	< 5 × 10 ⁻³ Torr
Ultimate Pressure (TMP)	< 2 × 10 ⁻⁵ Torr
Vacuum Leak Rate (He LD)	~10 ⁻¹⁰ Torr-lt/sec

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GAS SYSTEM SPECIFICATIONS

No. of Gas Lines	04 [H ₂ (1000 sccm), CH ₄ (100 sccm), N ₂ (2 sccm), O ₂ (10 sccm)], Extendable up to 06 gas lines
Gas Manifold	Electro-polished components; VCR fittings
Pressure Controllers	±0.25% of full scale
Mass Flow Controllers	±0.8% of reading and ±0.2% of full scale (N ₂) ±0.4% of reading and ±0.2% of full scale (Other specified gases)
Particle Filters	2 nm for each gas line & 10 µm for the vent line (Imported)

5

WATER MANIFOLD

Type	Flow control regulators, with flow range and stage temperature readings displayed on HMI
Water Pressure Gauges	Analog; individual gauge for input and output lines

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MICROWAVE SYSTEM SPECIFICATIONS

MW Power Supply	2.45 GHz, 6 kW/12 kW, SMPS Power Supply Muegge GmbH/Sairem
Tuner	Manual 3-Sub Tuner

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SAFETY

Zero Microwave Leakage	
Safety Interlocks and Alarms	

DIAMOND PRODUCTS

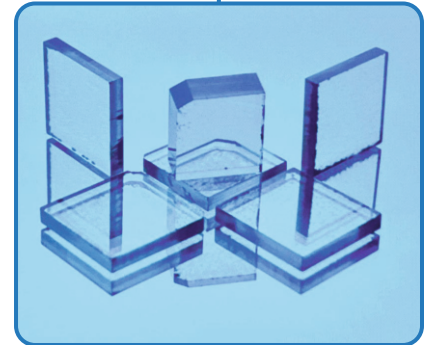
The technological advancement of diamond manufacturing made the process more controllable to curate diamonds with desired features. We at PDPL offer specialized NV centered diamonds, electronic, optical, and gem grades for the wide domain of respective applications.

A. ELECTRONIC GRADE

SPECIFICATIONS

- Grade: Electronic
- Crystallography: Single Crystalline
- Face Orientation: (100)
- Edge Orientation: (100)
- Thickness: Up to 1 mm
- Surface Roughness, Face side: <10 nm Ra
- Shape & Dimensions: Customised
- Nitrogen Content: <10 ppb
- NV Concentration: <5 ppb

Applications: High-power Electronics, Quantum Computing, Magnetic Field Sensing, Radiation Detector, etc.



B. OPTICAL GRADE

SPECIFICATIONS

- Grade: Optical
- Crystallography: Single Crystalline
- Face Orientation: (100)
- Edge Orientation: (100)
- Thickness: Up to 1 mm
- Surface Roughness, Face side: <10 nm Ra
- Shape & Dimensions: Customised

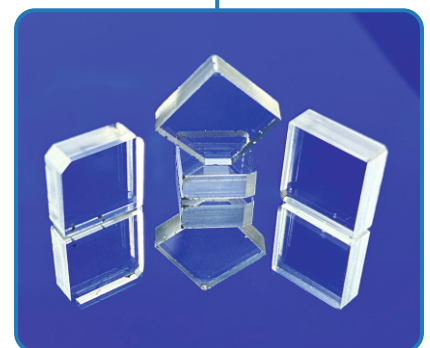
Applications: Exit Windows of CO₂-laser and Microwaves, Beam Splitters, Brewster Windows, etc.

C. GEM GRADE

SPECIFICATIONS

- Color: D-G
- Clarity: Better than VS1+
- Dimensions: < 15*15 mm²
- Height: Up to 8 mm

Applications: Jewellery and Luxury Industries



D. COATING SERVICES:

I. Heteroepitaxial Coatings

PDPL offers tailored heteroepitaxial growth of single-crystal diamonds (SCDs) on **Ir/YSZ/Si** substrates with minimized defects and low dislocation density to produce large-area SCDs for a wide spectrum of applications.

II. Poly- and Ultra-nano-crystalline Diamond Coatings

Poly- and ultra-nano-crystalline diamond coatings are available on a variety of substrates to enhance physical, chemical, and mechanical properties.

SPECIFICATIONS

- Coating: Poly-and Ultra-nano-crystalline
- Thickness: Submicron to 300 μm
- Substrates: Si, Ceramics, Insulators, Metals, etc.
- Thermal Conductivity: $\geq 1800 \text{ W/mK}$
- Grade: As per need

Applications: Heat Sinks in Electronic Devices, Fabrication of Advanced Lab-on-chip Sensors, Ultra-precision Cutting Tools, Tribology, etc.

III. Free-standing Polycrystalline Wafer

PCD exhibits exceptional thermal conductivity, high electron mobility, and high power capacity. The cost-effectiveness and availability of large-size wafers made PCD a desirable material.

SPECIFICATIONS

- Thickness: 200 to 700 μm
- Wafer Diameter: Up To 75 mm
- Crystallography: Poly-crystalline
- Grain Size: Submicron to Micrometers
- Surface Finish 1: As-grown
- Surface Finish 2: $< 50 \text{ nm Ra}$

Applications: Heat Spreader, Cutting Tool, Epitaxial Substrate and in Power Electronics, etc.





PRISTINE

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