WD Advanced Materials

Emerging Materials

DIAMOND

Quantum | Thermal | Ultra-Wide Bandgap Semiconductor

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Ceramics Expo | Thermal Management Expo
May 2026

Established Infrastructure and Operations

STATE-OF-THE-ART FACILITY

- Centralized control room and monitoring stations
- Dedicated diamond chambers and laser rooms



Automated Operations

PROPRIETARY GROWTH CHAMBERS

- 100s of CVD chambers designed and built in-house
- Dedicated post-processing 65+ unit laser room, with raman, optical microscopy, polishing and XRD



Laser Room

CONSISTENT QUALITY AT SCALE

- Automated systems, software and trained staff ensure consistency at ~20K+ wafers/month
- Streamlined quality assurances processes



Quality Control Center

MULTIPLE FACILITY REDUNDANCIES

- Redundancy ensures uninterrupted power distribution for all production equipment



Generators

EXPERT STAFF

- Academic and Operational experience drives technology and R&D leadership
- Over 100 years of combined diamond growing experience supporting our 15+ year operations
- Renowned material science experts and engineers specializing in CVD diamond growth

ENVIRONMENTALLY-FRIENDLY PRODUCTION

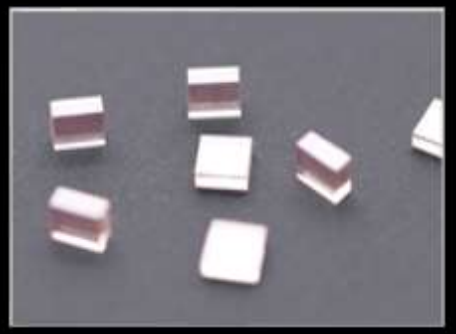
- Custom-built cooling system limits H20 consumption and maximizes chamber chilling efficiency



Chiller Unit

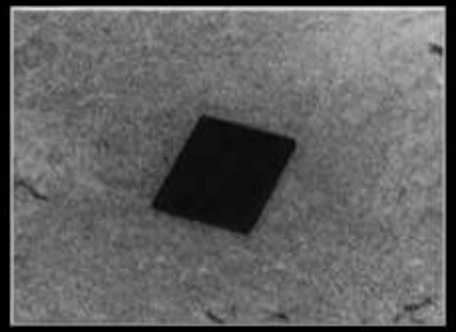
WDAM Single Crystal & Polycrystalline Diamond Products

High-quality diamond substrates, available to precise order specifications, at sizes ranging up to 25mm and beyond



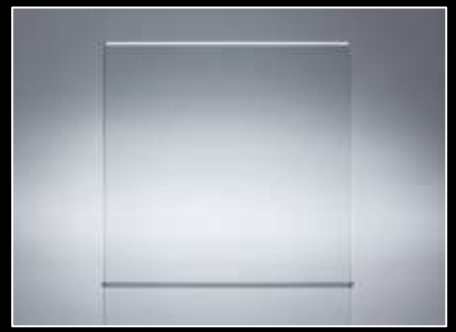
01_Quantum SCD

Isotopically pure film and bulk material featuring nitrogen vacancy (NV) centers, for use in next-generation technologies



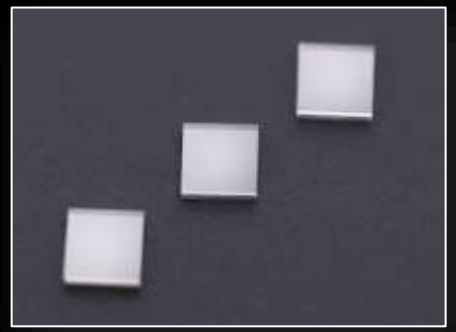
02_Conductive SCD

P-type boron-doped diamond wafers used across nano-indenters, deep-UV LEDs, and varied semiconductor devices



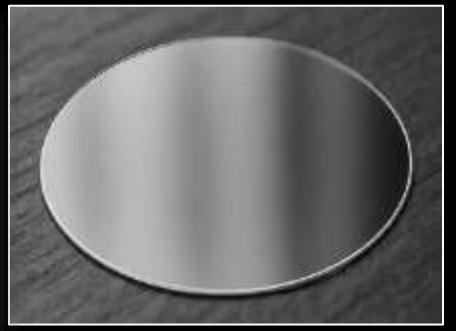
03_Intrinsic SCD

Ultra-pure, undoped electronic grade single crystal diamond substrates for use in sensitive thermal and optical applications



04_Optical SCD

Low-defect, low nitrogen diamond wafers for various scientific uses, including high-power electronics and surgical blades

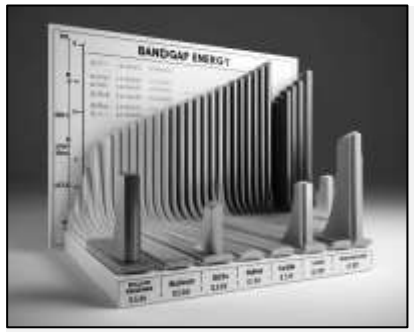


05_Polycrystalline

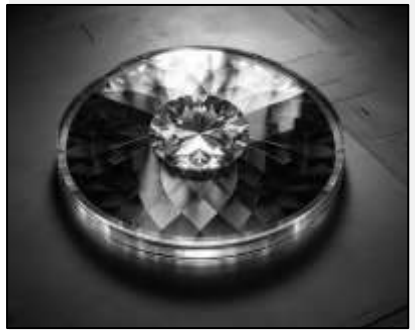
Thermal grade CVD polycrystalline diamond, available in film and bulk form, custom processed for advanced thermal applications

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Diamond As An Ultra-Wide Bandgap Semiconductor







The Reason

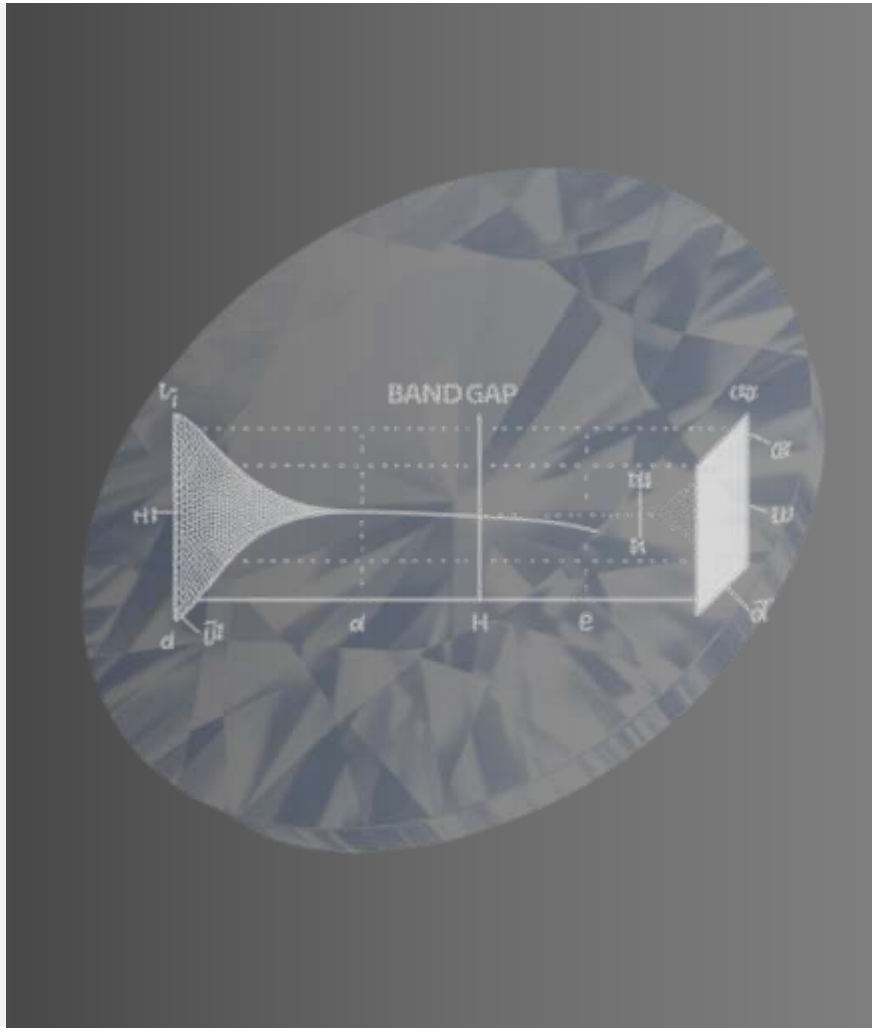
- High electron mobility: 2,200 cm^2/Vs
- Thermal conductivity: 2,200+ W/m·K
- Bandgap: 5.47 eV
- Efficient p-type dopant incorporation

The Challenges

- Current size limitations — typical sizes ~mm
- Challenging n-type dopant incorporation
- Wafering difficulties
- Polishing state of the art → mechanical
- Surface quality → low Ra, high sub-surface damage

The Future

- Polishing solutions already demonstrated
- Cost continues to decline with advancing tech
- DARPA UWBGS → UWGB devices in 3 years
- Heterogenous devices | Simplified thermal



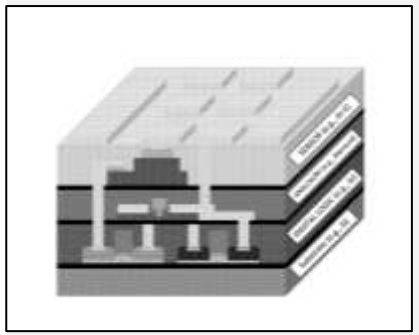
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WD Advanced Materials Thermal Solutions



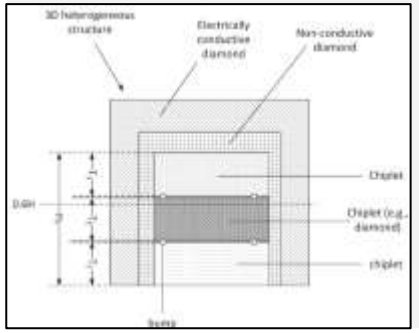
SuperThermal Substrates

- Isotopic enrichment of diamond
  → 40% increase in thermal conductivity
- Enriched region tuned to device parameters
  → Similar benefit, reduced cost



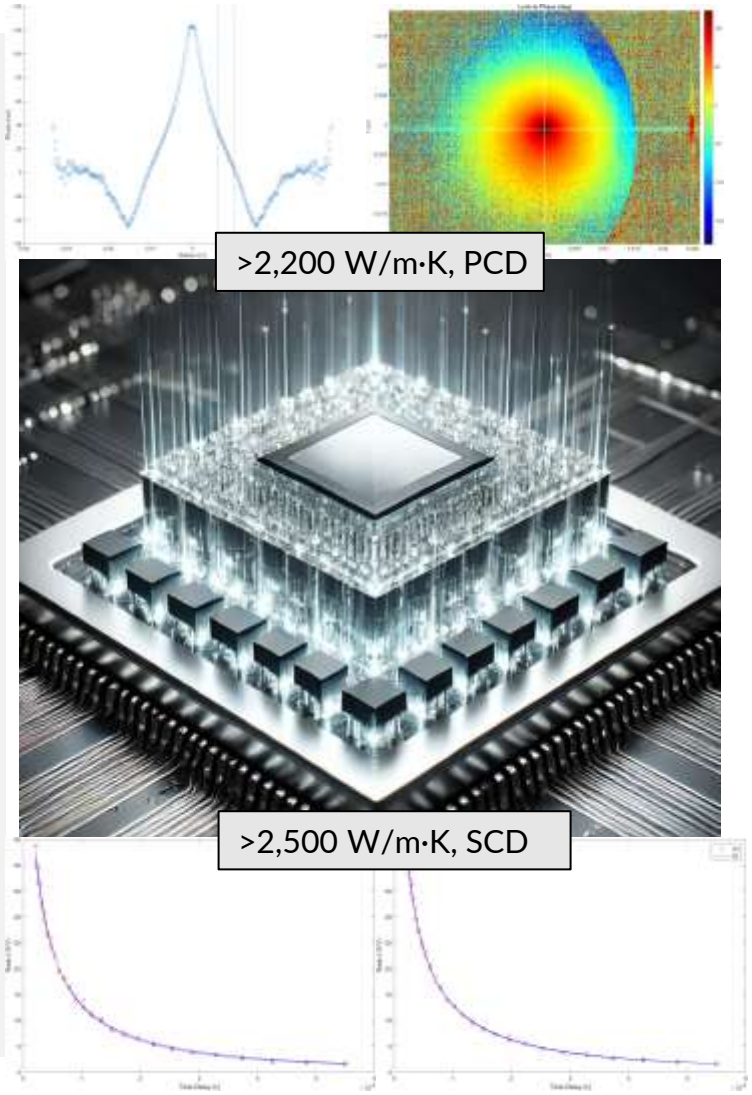
Passive/Active UWBG/Thermal Diamond Chiplets

- Integration of diamond chiplets into device
  → Power/Frequency applications
- Reduction of intradevice hotspot formation
- Integration with diamond thermal vias



Bimodal Diamond Integration with EMI Protection

- PCD cladding on chip
  → Pulls heat from chiplet/via to package
- High-κ interface – electrical isolation
- Highly conductive exterior – electrical protection



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