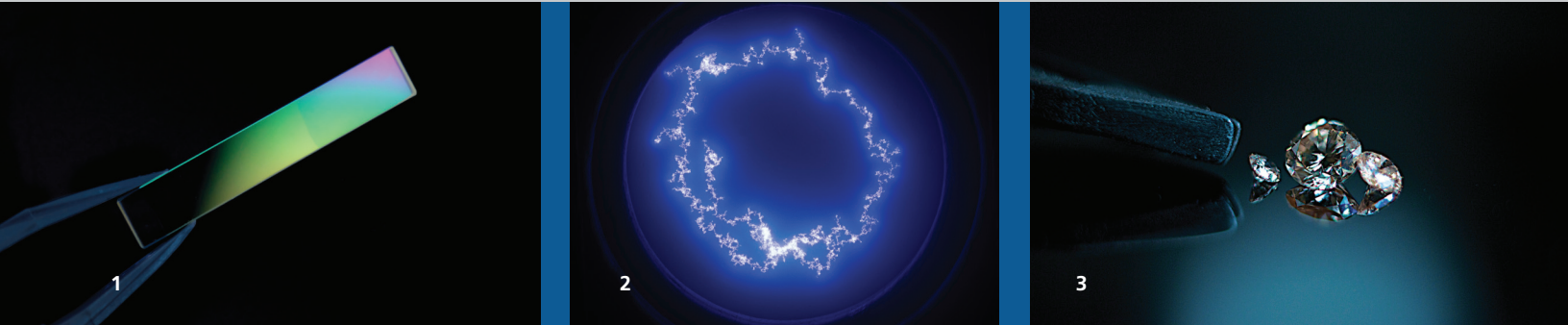




Fraunhofer USA

FRAUNHOFER USA CENTER FOR COATINGS AND DIAMOND TECHNOLOGIES CCD



- 1. TCO coating
- 2. Advanced Plasma Assisted (APA) arc discharge
- 3. Brilliant cut single crystal diamonds

CENTER FOR COATINGS AND DIAMOND TECHNOLOGIES

Fraunhofer USA Center for Coatings and Diamond Technologies CCD

1449 Engineering Research Ct.
East Lansing, MI 48824, USA

Contact

Thomas Schuelke, Director
Phone: +1 517 4328709
ccd-info@fraunhofer.org

ccd.fraunhofer.org

Fraunhofer USA CCD Offer

The Fraunhofer USA Center for Coatings and Diamond Technologies CCD is the optimal professional research partner for developing applications and products using thin film coatings and diamond materials. Fraunhofer USA CCD provides innovative technology solutions and unique research and development services to federal and state governments, multinational corporations, small and mid-sized companies, and non-profit organizations.

Fraunhofer USA CCD supports technology development and deployment by bridging the gap between basic research and industry. Providing first class applied R&D services and offering access to state-of-the-art equipment and technology expertise, Fraunhofer USA CCD supports its customers to enhance their products and competitive edge.

Fraunhofer USA CCD specializes in coating manufacturing technologies such as chemical and physical vapor deposition (CVD/PVD) offering materials and process development as well as associated systems.

Capabilities

Fraunhofer USA CCD's capabilities in carbon-based materials synthesis and thin film deposition technologies include diamond and diamond-like carbon (DLC) materials ranging from nanometer thin amorphous carbon films to multiple millimeter thick freestanding diamond materials. Apart from carbon materials, Fraunhofer USA CCD has in-depth know-how of ceramic coatings.

Markets

The broad spectrum of expertise and know-how enables Fraunhofer USA CCD to provide coatings and diamond technology solutions to customers from a broad range of markets including energy, environment, automotive, electronics, aerospace, packaging, and medical devices.

IN COOPERATION WITH





R&D Services

Fraunhofer USA CCD offers professional research services to develop, test, and deploy coating and diamond technology solutions.

Projects are typically performed under the protection of a non-disclosure agreement with the customer. Contract terms and conditions are negotiated prior to commencing work on the project. Project timelines and finances depend entirely on the scope of the work to be done. Fraunhofer USA CCD offers work at competitive engineering rates.

Examples of project work include:

- Specialized coating materials and process development for demanding applications across industries
- Wear resistant low-friction coatings for powertrain applications
- Wear and temperature resistant coatings for cutting and forming tools
- Optical coatings
- Ultra barrier coatings
- Batch coating services
- Diamond material and application development
- Doped diamond crystals
- Boron-doped diamond electrodes for electrochemical applications
- Specialized coating and characterization equipment
- Consulting services on coating solutions and diamond material applications

Characterization

Analyzing synthesized materials is critical to ensure product performance. Fraunhofer USA CCD offers a wide array of analysis and characterization measurements and techniques for carbon materials including:

- Hall measurements of charge carrier mobilities
- UV-Vis and IR spectroscopy
- Raman spectroscopy
- Birefringence measurements
- Scanning electron microscopy (S-EM) including energy-dispersive X-ray spectroscopy (EDX) for chemical analysis
- X-ray diffraction (XRD)
- X-ray photon spectroscopy (XPS)
- Electrochemical analysis
- Sheet resistance measurements
- Young's modulus measurements
- Surface roughness measurements
- Wear volume and coefficient of friction (dry and lubricated)
- Thin film adhesion quantification
- Contact angle measurements
- Thin film thickness measurements
- Atomic Force Microscope (AFM)

Application Examples

- Diamond electronics
- Diamond optical crystals (e.g. ATR crystals)

- High power diamond windows
- Diamond foils (1-50µm thick)
- Diamond coated wafers
- Boron doped diamond (BDD) electrodes for electrochemical applications
- BDD microelectrodes and micro-electrode arrays
- Diamond for MEMS devices
- Diamond and Diamor® coatings for implants
- Diamond or Diamor® coated atomic force microscope tips
- Transparent Diamor® coatings
- Hydrophobic and hydrophilic Diamor® coatings
- Diamor® coatings for wear parts and engine components
- Diamor® coatings for cutting tools
- Ceramic coatings to protect tools used in high temperature processes

How To Get Started

Contact us at +1 517 432 8709 to discuss your needs and our capabilities and to evaluate how we can help you solve your technology and product development challenges.

1. Cutting laser apparatus

2. Fraunhofer USA CCD main entrance