Advanced Ceramics and Specialized Products for Demanding Applications

CeraNova

CeraNova Corporation

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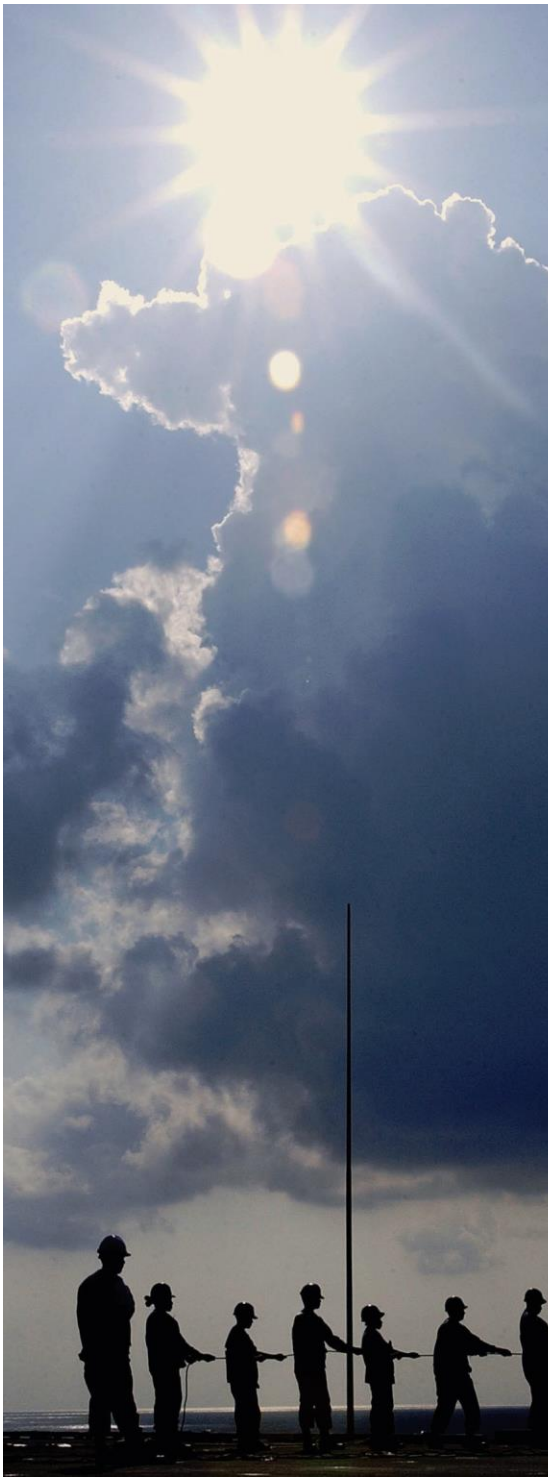
CeraNova was founded in 1992 as a developer of technical ceramic materials for advanced applications. It is a globally recognized leader in ceramic materials and process technology. CeraNova provides materials engineering, manufacturing process development, and prototype components to meet the most demanding environments and system requirements. The company has deep expertise in all aspects of technical ceramics, from raw materials processing to finish machining and polishing. We deliver innovative advanced ceramic materials, prototypes, and product development planning to government, defense, industrial, and commercial organizations worldwide.

With extensive experience in ceramics and ceramic composite processing and characterization, CeraNova is well positioned to provide contract technology development and LRIP (low rate initial production) manufacturing for ceramic-based components and sub-systems in the most demanding applications. CeraNova seeks partnerships with established component manufacturers and system integrators to support insertion into major Department of Defense programs.

Many large companies have reduced their in-house capabilities in ceramic materials development and there is a growing need for external providers with ceramic materials expertise. CeraNova's knowledge base, agility, and well-equipped facility enable quick product development and fast ramp-up to initial production, providing much more cost-effective solutions than can be achieved at larger organizations.



Mission

CeraNova's mission is to be a leading provider of innovative products and advanced manufacturing for cutting-edge engineered ceramic materials. We will take on difficult challenges that others cannot or will not do, and work with our clients to deliver the highest quality cost-effective solutions to meet their requirements.

Vision

To become a key provider of advanced ceramic materials and components that deliver a superior technological advantage to significantly enhance legacy system performance and enable new technologies for the US military and commercial sectors.

Values

CeraNova is driven by its core values. We consistently interact with the highest **integrity** towards our customers and employees; we offer **innovative** solutions and are **diligent** in completing our assigned tasks; we hold ourselves **accountable** to each other and to our customers; we act **selflessly** internally and externally and lastly, we organize and prioritize to maintain the **agility** needed to meet our customers' demanding schedules.

Core Capabilities

CeraLumina™ Hemispherical Dome

Material Systems

- Alumina (CeraLumina™)
- Spinel
- Yttria
- Zirconia
- Optical Composites
- Structural Composites

Applications

- Transparent Windows and Domes
- Visible and MWIR Lenses
  - For extreme temperature or harsh environments
- Controlled Microstructure Components
  - For optimum strength, optical or dielectric performance
- Solid State Ceramic Lasers & Scintillators
- Filtration and Separation
- Dental components

Processing Technologies

- Mixing: High Shear, Compounding, Roller Milling, Attritor Milling,
- Powder Processing and Net-Shape Forming: Pressing, Casting, Extrusion, Nano-Material and Colloidal
- Thermal Processing: Air and Controlled Environment Heat Treatment
  - inert, oxygen, and hydrogen furnaces
- Thermal and Atmosphere-Controlled Annealing
- Optical Fabrication: Grinding (Generating) & Polishing of Flat (Plano), Spherical and Aspherical Shapes

Characterization & Evaluation

- Microstructure Analysis
- Mechanical Properties Testing
- Spectrographic Analysis in the UV, VIS and IR
- Dilatometry and Thermal Expansion
- Metrology and Surface Analysis (CMM / Profilometry / Interferometry)

Products

Optical Windows and Domes

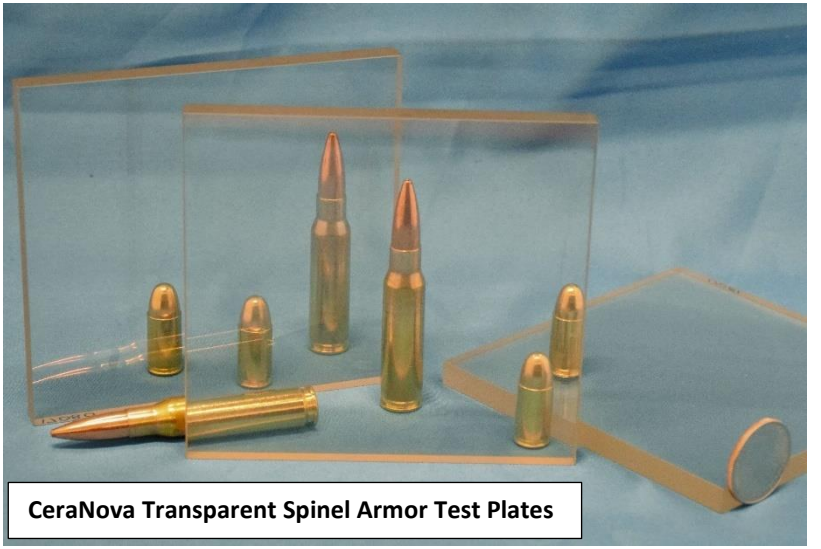
CeraNova offers optically transparent ceramics essential for an increasing number of military, industrial, and commercial products such as laser- and IR-guided missiles, transparent armor, high intensity lighting and high temperature furnace windows. In many of these cases, only ceramics will withstand the high temperatures, harsh chemical or debris exposure, and other extreme physical conditions while maintaining the required optical properties.

CeraNova has developed innovative and cost-effective manufacturing processes for transparent ceramic components, including hemispherical domes for legacy missile systems and aerodynamic dome geometries for next-generation platforms. CeraNova's net shape processing enables unique designs for conformal windows and large panels that are not possible with other fabrication methods. These new geometries require innovative manufacturing and metrology methods that are cost-competitive and produce parts that meet performance, quality, and durability requirements.

For applications requiring transparency in the UV-Vis-MWIR range, CeraNova manufactures ceramic windows from materials such as alumina, magnesium aluminate spinel, and yttrium oxide.

CeraLumina™ Aerodynamic Dome

In addition to military and defense applications, CeraNova is developing nonmilitary uses and applications for its fine grain and transparent ceramics.



CeraNova Transparent Spinel Armor Test Plates

Services / Capabilities

- Contract R&D
- Product Development
- Process Development
- Prototypes
- Small Volume and LRIP Manufacturing
- Turn-Key Process Systems
- Process Scale-up

Customers / Collaborators

DoD Prime Contractors

Government / National Labs

- NASA –Marshall Space Flight Center
- ARMY- RDECOM, ARDEC, AMRDEC
- NAVY – ONR, NAVAIR, NSMA
- Air Force – AFOSR, AFRL, AFML
- DARPA
- MDA and OSD/SCO

Industrial / Consumer Products

- Lighting, Automotive, Dental, Optical

Academic Institutions

- Univ. of Dayton Research Institute
- Penn State University / EOC
- Johns Hopkins University
- University of Rochester

Profile

CeraNova Corporation is a privately held company specializing in advanced materials for defense, industrial and commercial markets. Founded in 1992, CeraNova has extensive experience in processing and manufacturing technical ceramics. The company has a strong record of success, winning numerous government and commercial contracts for process and product development. For the last 12 years, CeraNova has focused on transparent ceramic materials.

Dr. John Gannon is President and CEO of CeraNova. He has over 25 years of experience in research, development, characterization, and manufacturing of advanced materials and engineered products. Dr. Gannon has extensive experience/training in business and project management, process improvement, quality systems, and ISO implementation. He is a certified Project Management Professional (PMP) and holds a Ph.D. in Materials Science and Engineering (Ohio State University), a M.S. in Engineering Physics (University of Virginia), and a B.S. Electrical Engineering (Northeastern University).

Dr. Marina Pascucci is Director of Government Programs and Contracting and has been with CeraNova for over 20 years. She has broad experience in materials processing and characterization, including early work on transparent and translucent ceramics at GTE Laboratories in the 1980s. She also held positions at Battelle Columbus Labs and Worcester Polytechnic Institute. Dr. Pascucci is a Fellow and past President of the American Ceramic Society. She has a Ph.D. and M.S. in Materials Science (Case Western Reserve University) and a B.S. in Ceramic Science (Alfred University).

Dr. Mark Parish is Founder and Technical Director of CeraNova. Over the course of his 30-year career he also founded or co-founded several advanced ceramic manufacturing companies including Ceramics Process Systems, CPS Superconductor, and Specific Surface Corporation. Dr. Parish has extensive experience in ceramic powder processing and materials including superconductors, piezoelectric, and additive manufacturing (3DP) of ceramic particulate filters. He holds a Ph.D. and M.S. in Materials Science and Engineering (MIT) and a B.S. in Ceramic Engineering (Alfred University).

Mr. Richard Adams is Director of Product Development. He recently joined CeraNova after 30 years at CPS Technologies where he successfully managed multiple teams through all phases of product development from design through engineering, manufacturing, and quality assurance. Mr. Adams has extensive experience in processing, characterization, manufacturing, and marketing of ceramics for defense, automotive, armor, and consumer products. He holds a M.S. (MIT) and a B.S. (Alfred University) in Ceramic Engineering.

CeraNova Corporation is a leading source for processing, characterization, development and pilot-scale manufacturing of innovative, high technology ceramics and ceramic composites.

CeraNova is actively seeking opportunities for its technologies with application developers, system integrators, and commercialization partners.

Core Advantage

CeraNova's core advantage derives from its nationally recognized ceramics experts, state-of-the-art processing capabilities, and a company culture all focused on driving innovation and delivering value.

Value Proposition

CeraNova develops new and cost-effective solutions that provide compelling competitive advantages for our customers. We tackle challenges that others cannot or will not take on by drawing upon decades of expertise and working side-by-side with our clients. We deliver exceptional solutions through customized materials, processes, and tooling, with emphasis on design for manufacturability (DFM) and the most advanced manufacturing methods.

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