SPS-P²C

One Step Powder to Part Compaction

THE ONLY AMERICAN SUPPLIER OF SPARK PLASMA SINTERING SYSTEMS/ PULSED DIRECT CURRENT SINTERING WITH DUAL RAM TECHNOLOGY ALONG WITH THREE DECADES OF OPERATIONAL EXPERIENCE.

The time proven, award winning SPS-P²C Plasma Sintering Equipments, with their superior process profiling technology, and large part capacity, can deliver next-in-class materials allowing the realization of your most challenging and dynamic materials engineering and research ideas.

SPS-P²C 100

SPS-P²C 200

SPS-P²C 300

Model	Press Capacity Tons (kN)	Max. Current A (@V)	Max Temp. (°C)	Sample Size	Chamber Size
SPS-P²C 100	50 (498)	15,000 (0-12)	2500	4″x4″x0.25″	15″ x 20″
SPS-P²C 200	200 (1,992)	15,000-50,000 (0-30)	2500	6″x 6″x0.50″	20″x 40″
SPS-P²C 300	250/500 (2491/4982)	50,000-100,000 (0-30)	2500	10″x10″x1.0″	30″x30″x36″

SPS-P²C-powder compaction technology is specifically designed to unlocking the high-performance promises suggested by submicron and nano-scale science and materials engineering.

- **SPS-P²C can compact nano, submicron and micron particulate blends with powders of all shapes**
- **P²C equipment and processing offers significant economic and physical performance improvements over traditional hot pressed and sintered.**

SAFETY 1st—Auto-Shutoff over-temp protection systems monitor key components

VERSATILITY and ACCESSIBILITY – Ease of sample loading/removal

VACUUM CHAMBER—Stainless Steel, Water cooled, Multiple gases can be used for sintering

SYSTEM START UP & TRAINING—Installation and training will be provided onsite.

MATERIALS MODIFICATION INC.

Materials Modification, Inc. | 2809-K Merrilee Dr. | Fairfax, Virginia | 703-560-1371 | www.matmod.com

Proudly Made In the USA

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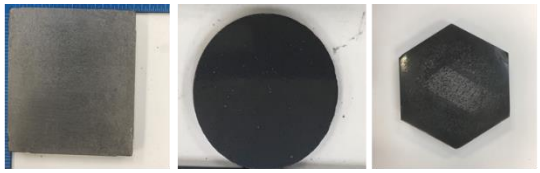
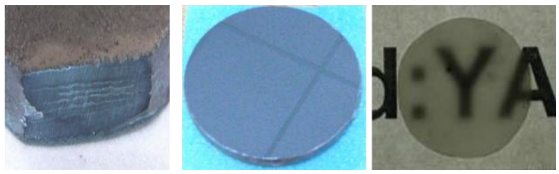
Shapes & Sizes



Armor & Tools

Composites Mirrors & Opticals



- **Metals**—Fe, Ni, Cu, Al, Co, Re, W, Mo, Ta, Ti, Mg, NiAl, TiAl
- **Ceramics**—SiC, B_4C, ZrO_2, TiB_2, HfB_2, ZrB_2, $Y_3Fe_5O_{12}$, TiC, WC, $Y_3Al_5O_{12}$, MgB_2, CaF_2, MgF_2, MoS_2
- **Composites**—TiB_2-Al_2O_3, TiB_2-ZrO_2, TiB_2-B_4C, SiC-B_4C, WC-Co, Mo-Cu, W-Cu, C-Cu, HfC-TaC, ZrC-B_4C
- **Multilayered Materials**—Up to 5 layers of differing functional properties
- **Unconventional Structures**—Nano-Carbon and Layered Composites | Porous Materials | Joining of Dissimilar Materials

The Innovative Solution— SPS-P²C Leaps Beyond Conventional Hot Pressing and Sintering

- Predictable Uniformity—Ability to start consolidation with nano-scale materials and end with nano crystalline grain structures
- Greater final material purity—No binders, No cementation/alloying agents, Low/No unprocessed reactants, No Canning Required, Unrestricted geometries possible.
- One-Step in-situ compaction, plus rapid uniform plasma heating for maximum densification and control over grain structure
- Maximum theoretical densities, exclusive preprocess cleaning and out gassing of particulate surface contaminants for excellent inter-particle fusion
- Low-temp/high thermal energy sintering yields fast-cycle consolidation—minutes vs. hours.

Answering Challenges of High Purity, Wear, Heat and Corrosion in Typical Commercial Applications

- Unrestricted R&D engineering with submicron/nano-scale metallic, ceramic and hybrid materials, new classes of bi-metal, ceramic/metal laminations, multi-material matrix/composites
- Custom Nano and Sub-Micron Sputtering Targets | Super Performance Seals and Bearings | Oil and Gas Well Drilling Components | Tube/Wire Drawing and Extrusion Die Inserts | Hot and Cold Forming Punches | Carbides for Wire EDM | Large Cutting Inserts | Brake Materials | Wire and Mandrel Tube Preforms | Water Jet Nozzles | Abrasion Resistant Parts | Mirrors and Optical Components (Lasers)

Broad Government and Commercial Market Segments

Metals, ceramics or hybrids designed for applications in land, sea, air and space defense, medical and industrial markets where low/no downtime are crucial considerations.

High Temperature Mirrors | IR Windows | Lightweight Body Armor Inserts | Exterior and Interior Vehicular Armor | Fixed and Rotary Wing Aircraft Cockpit Armor | General R&D and Engineering Development of Ceramic, Metallic, and Functionally Gradient Materials | Refractory Metal Substrates

US Patents: 5,989,487 | 6,001,304 | 6,183,690 B1 | 6,187,087 B1 | 6,309,591 B1 | International Patents: AU: 752326 | IN: 197635

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