

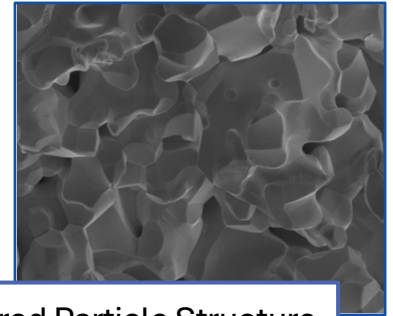
CPS Technologies

Powder Ceramics and Metals

CPS Technologies has advanced manufacturing capabilities in the field of powder metallurgy and ceramics and is capable of producing complex parts from a wide range of materials and processes.

Benefits

- Our proprietary injection molding and Binderjet processes yield preforms with densities typically greater than 60%.
- These special processes reduces the amount of binder needed, yielding more stable preforms that reduce stress and distortion during sintering.
- Low pressure injection molding enables long tool life.



Sintered Particle Structure

Materials include:

- | | |
|-------------------|--------------------|
| ➤ Silicon Carbide | ➤ Tungsten |
| ➤ Boron Carbide | ➤ Tungsten Carbide |
| ➤ Silicon Nitride | ➤ Nickel Alloys |
| ➤ SiALON | ➤ And More! |

Example: SiALON Rotor

Injection Molded SiALON

- Through development work with a partner, CPS produced an advanced SiALON rotor for high temperature operations
- Our low-pressure injection molding process allowed the use of more complex tooling to eliminate secondary machining operations
- Demonstrated flexibility to support numerous additional ceramics including aluminum oxide, aluminum nitride, zirconia, mullite, and silicon nitride



SiALON Rotor



Powder Ceramics and Metals

CPS is actively expanding our powder ceramics and metals portfolio. The following case studies demonstrate novel manufacturing processes, material systems, and applications:

Binderjet Additive Manufacturing

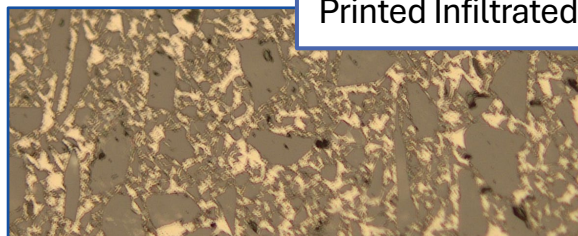
CPS has been actively working with several partners to industrialize Binderjet Additive Manufacturing for our preform manufacturing process. CPS powder feedstocks are well suited for the binderjet process:

- CPS' proprietary particle blend is highly compressible, yielding dense printed preforms that can either be sintered or infiltrated to full density.
- Printed densities regularly exceed 60 volume percent
- Binder jetting is complementary to CPS injection molding process, allowing for thinner (<1mm), thicker (>2"), and larger (>200 in²) preforms

Printed SiC Preforms



Printed Infiltrated AlSiC



Controlled Fragmentation WHA-Warhead Fabrication



CPS Technologies has been awarded a Phase II contract with the US Army to continue development efforts on heavy tungsten (WHA) injection molding for fragmentation warheads. During the Phase I program CPS demonstrated that our Quickset Injection Molding™ process can:

1. Make repeatable and predictable WHA preforms that can be sintered using industry standard equipment.
2. Produce 3D features inside the warhead.



Electromagnetic Protection Coating



Under a Phase I SBIR contract with the US Army, CPS demonstrated that the Quickset Injection Molding™ process can be used to apply conformal ceramic coatings to typical artillery shell materials.

1. CPS developed a proprietary intermediary bonding agent to facilitate sintering of an Ultra Low Temperature Cofired Ceramic (ULTCC)
2. CPS applied ULTCC conformal coatings to three dimensional shapes to demonstrate manufacturing feasibility.

