

# Product Technical Information

## Sprayable Superfine Zirconia-based Thermal Spray Feedstock Powder

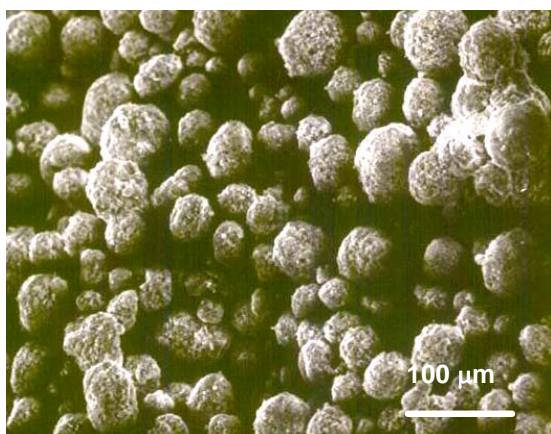
### Infralloy™ 4000 Series

#### Thermal Spray Grade

Zirconia and its composite material are used as high temperature (thermal barrier coatings or solid fuel cell material) applications

Infralloy™ 4000 series powders are available as agglomerated particles with high flowability

#### Powder Morphology



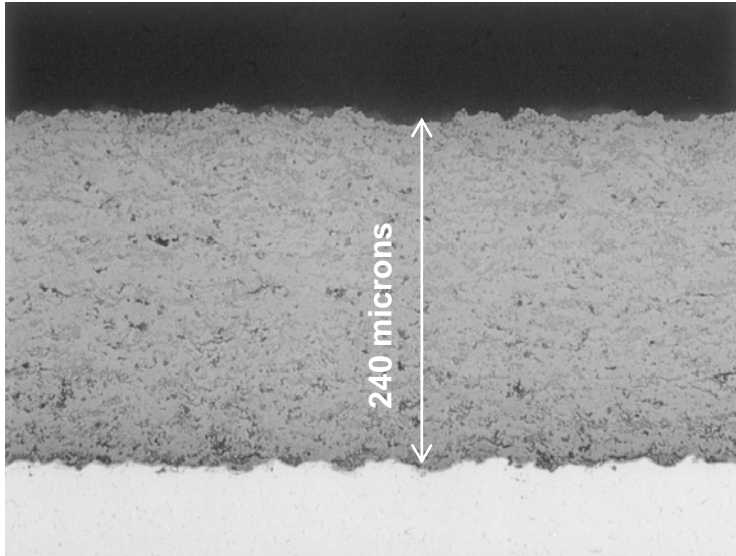
SEM micrograph typical of Infralloy™ 4007 yttria-stabilized-zirconia (7YSZ) feedstock powder showing spherical geometry that enables high flowability.

#### Properties of Infralloy™ 4000 Series Powder

Elements & Properties	Infralloy™ 4000 Zirconia-based Thermal Spray Powders				
	4007	4012	4020	4022	4028
ZrO <sub>2</sub>	93%	88%	80%	78%	72%
Y <sub>2</sub> O <sub>3</sub>	7%	12%	20%		10%
TiO <sub>2</sub>					18%
MgO <sub>2</sub>				22%	
Grain Size (Ave.), μm	0.1 - 0.5	0.1 - 0.5	0.1 - 0.5	0.1 - 0.5	0.1 - 0.5

- 1 micron (μm) = 10<sup>-6</sup> meter (m)
- Particle size cut can be: +10 to 53μm, +10 to -75 μm, depending on customer's needs

## Coating Morphology



Optical micrograph typical of Infralloy™ 4007 coating microstructure revealed porous TBC coating (photo taken at 200X)

---

## Applications

Inframat® Infralloy™ 4000 Series powders are superior coating material used as high temperature (thermal barrier coatings or solid fuel cell material) applications providing good thermal insulation, or electronic properties, or erosion and wear resistance properties.

<b>S4007</b>	Good thermal barrier properties, partially stabilized, use up to 2450°F
<b>S4012</b>	Good thermal barrier properties, partially stabilized, use up to 2100°F
<b>S4020</b>	Good thermal barrier properties, fully stabilized, use up to 1700°F, fuel cell applications
<b>S4022</b>	Good thermal barrier properties, erosion resistance, resistant to molten metals
<b>S4028</b>	Sliding wear (bearing), thermal barrier in automotives

The Thermal Spray Grade material can be applied with DC Arc plasma guns. Full spray specifications for each composition, including: S4007, S4012, S4020, S4022, and S4028 are available through Technical Applications Bulletins Nos. S4000.07B.

---

Inframat® Corporation  
74 Batterson Park Road  
Farmington, CT 06032  
1-888-NANO-888  
1-860-678-7569 fax  
web: [www.inframat.com](http://www.inframat.com)  
email: [info@inframat.com](mailto:info@inframat.com)

The information and recommendations contained in this publication are based upon data collected by Inframat Corporation and believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein, and Inframat Corporation assumes no responsibility for the results of the use of these products and processes described herein. No statements or recommendations made herein are to be construed as inducements to infringe any relevant patent, now or hereafter in existence.

