

# International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI)

Balapur P.O., Hyderabad – 500005, Telangana, India



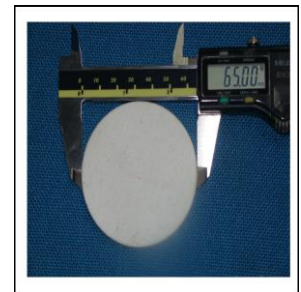
## Zirconia Ceramics with Engineered Porosity for Thermal Management Application

### Overview

Engineered porosity plays an important role in achieving low thermal conductivity and hence on insulating performance. However, the loss of strength becomes an important disadvantage with increasing porosity. Quantity of porosity along with the tailored pore size becomes critical to choose an optimum as these properties conflicts each other. Methodologies are successfully developed to fabricate zirconia ceramics with optimum porosity and strength for thermal management applications.

### Key Features

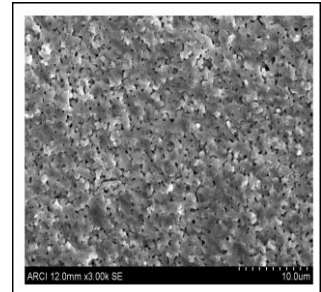
- Low thermal conductivity (<math><1\text{W/m-K}</math>)
- Highly stable cubic structure
- Engineered porosity through fugitive pore formers
- Moderate mechanical strength through optimum pore size distribution
- Stability and durability in harsh environments
- Capability for complex shaping



Zirconia porous disc ground to 65mm dia

### Potential Applications

- Self standing ceramic parts for insulation
- High temperature insulation up to 1500°C



Closed pores microstructure of zirconia porous disc

### Intellectual Property Development Indices (IPDI)

- Key parameters demonstrated on coupon level
- Formulation finalized and Heat treatment schedules optimized
- scale up trials are in progress

Status	1	2	3	4	5	6	7	8	9	10

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