



Zirconia-Based Electrolyte Materials

fuelcellmaterials.com offers nanoscale zirconia-based electrolytes which have advantages over traditional yttrium stabilized zirconia (YSZ). YSZ is the most popular electrolyte material for solid oxide fuel cells (SOFCs) because it conducts only oxygen ions over a wide range of oxygen partial pressures. YSZ membrane supported SOFCs are normally operated at temperatures above 800°C to achieve sufficiently high oxygen ion conductivity. Scandium-doped zirconia (ScSZ) provide higher oxygen conductivity than YSZ. For both materials, the thinner the electrolyte membrane the higher the performance. Nanoscale zirconia electrolyte materials are ideal for fabricating thin film electrolytes in electrode supported solid oxide fuel cells via colloidal deposition processes. YSZ nanopowder has ultra-high surface areas and is delivered as a softly agglomerated powder sieved through 60 mesh screens. ScSZ nanopowders are available upon special request. *fuelcellmaterials.com* also offers submicron YSZ and ScSZ powders suitable for tape casting, pellet pressing and other fabrication methods. Custom doped zirconia compositions can be produced to your specifications.

Applications

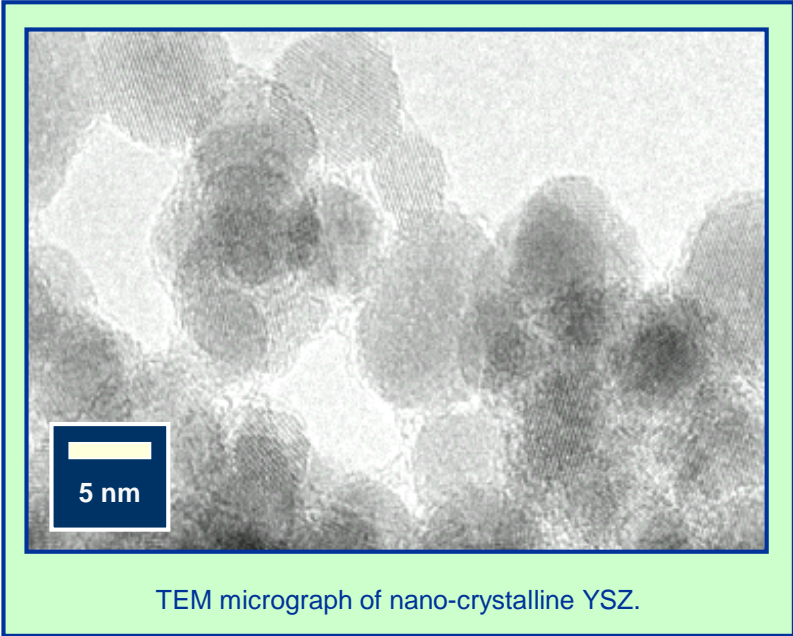
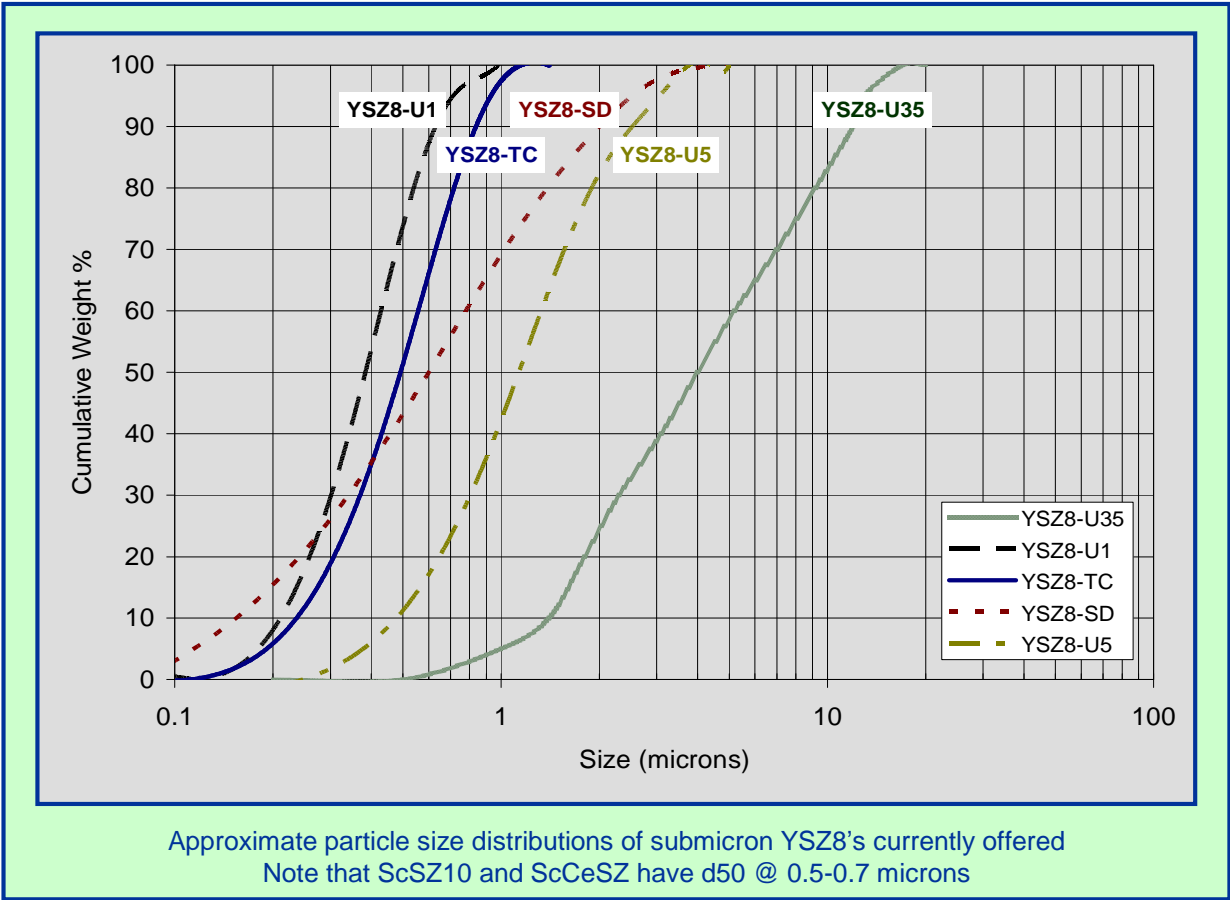
- Electrolyte material for solid oxide fuel cells, oxygen generation systems and sensors
- Nanoscale is an additive to reduce sintering temperature of tape cast grade powders
- Component in composite electrodes (anodes and cathodes)

Benefits

- High crystalline-phase and chemical purity
- Wide range of possible materials
- Availability of materials in research quantities

Product Specifications	
Compositions (*)	YSZ: $(ZrO_2)_{0.92}(Y_2O_3)_{0.08}$ ScSZ10: $(ZrO_2)_{0.90}(Sc_2O_3)_{0.10}$ ScCeSZ: $(ZrO_2)_{0.89}(CeO_2)_{0.01}(Sc_2O_3)_{0.10}$
Crystal Structure	Single-Phase Fluorite
Surface Areas	Nano-powder: >100 m ² /g YSZ8-TC: 4-8 m ² /g YSZ8-SD: 13-19 m ² /g YSZ8-U1: 10-15 m ² /g YSZ8-U5: 3-7 m ² /g YSZ8-U35: 1-3 m ² /g ScSZ10: 8-11 m ² /g ScCeSZ: 10-12 m ² /g
Crystallite Size (nano-YSZ)	5-10 nm
(*) Custom formulations available	

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