## Nanoceramics

Nanoceramics are ceramic materials made up of nano-sized structural units with at least one aspect of the element below 100 nm. Nanoceramics are defined by their mechanical properties, such as great strength, excellent toughness, and high fatigue resistance. the conductivity of most of the materials can be altered while being made up of nanoscale constructing blocks. Though the poor ductility of most nanoceramics limits their practical application, their exceptional physical, chemical, and mechanical qualities such as magneto resistivity, fracture toughness, electro-optical abilities and piezoelectric properties.


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## Nuclear Ceramics

Nuclear ceramics refer to materials that are used in nuclear applications due to their properties, such as high-temperature stability, corrosion resistance, and radiation tolerance. These materials are primarily ceramics, which are inorganic, non-metallic solids that are typically hard and brittle. 1. Uranium dioxide ($UO_2$): most common ceramic fuel used in nuclear reactors. It has a high melting point and good thermal conductivity. 2. Zirconium dioxide ($ZrO_2$): used as a cladding material for nuclear fuel rods due to its excellent corrosion resistance and mechanical strength..


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## Dielectric Ceramics

Dielectric ceramics are non-conductive materials with insulating properties, often used in electronic components. Their low electrical conductivity makes them suitable for applications requiring electrical insulation, like capacitors and insulators in electronic circuits. Dielectric ceramics also find use in antennas, where their properties aid in signal transmission and reception. Moreover, they're employed in resonators for frequency stabilization in electronic devices. With their ability to store and manage electrical energy without significant loss, dielectric ceramics are vital components in numerous electronic system.


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