

Ceramic nanocomposites

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Abstrak

Ceramic nanocomposites have been found to have improved hardness, strength, toughness and creep resistance compared to conventional ceramic matrix composites. Ceramic nanocomposites reviews the structure and properties of these nanocomposites as well as manufacturing and applications. Part one looks at the properties of different ceramic nanocomposites, including thermal shock resistance, flame retardancy, magnetic and optical properties as well as failure mechanisms. Part two deals with the different types of ceramic nanocomposites, including the use of ceramic particles in metal matrix composites, carbon nanotube-reinforced glass-ceramic matrix composites, high temperature superconducting ceramic nanocomposites and ceramic particle nanofluids. Part three details the processing of nanocomposites, including the mechanochemical synthesis of metallic–ceramic composite powders, sintering of ultrafine and nanosized ceramic and metallic particles and the surface treatment of carbon nanotubes using plasma technology. Part four explores the applications of ceramic nanocomposites in such areas as energy production and the biomedical field.