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Cubic Boron Nitride Reinforced Sialon Nano-Composites by Spark Plasma Sintering

Abbas Saeed Hakeem[1], Bilal Anjum Ahmed[2], Akolade Idris Bakare[1], Ibrahim Ahmed Ibrahim Ali[1], Muhammad Ehsan Ali[1] and Tahar Laoui[1,2]

[1]Center of Excellence in Nanotechnology, King Fahd University of Petroleum & Minerals, Saudi Arabia
[2]Mechanical Engineering Department, King Fahd University of Petroleum & Minerals, Saudi Arabia

Aluminosilicate oxynitride and cubic boron nitride (cBN) composites having excellent mechanical properties and chemical stability in room temperature to high temperature applications. In the present study, cubic boron nitride (cBN) reinforcedalpha-Sialonnano-composites were preparedusing spark plasma sintering (SPS) technique. The starting powders including Sialon precursors and various particles size of cBN (10, 20 and 30 wt.%) were homogeneously mixed by probe sonication before sintering. The effect of SPS processing parameters on the densification and mechanical behavior of these nano-composites were investigated. These cBN enabled in the densificationsialon composite samples were analyzed for phase identification by X-ray diffraction. As well as, composite samples were evaluated to find cBN to hBN transformation in the Sialon matrix sintered at 1500°C. Field emission scanning electron microscopy(FESEM) used for morphology and hardness and fracture toughnesswere measured.

Biography:

Dr. Hakeem has completed his PhD. in Materials Chemistry (in the field of SiAIONs hard materials) from Arrhenius Laboratory, Stockholm University, Sweden (2007). He also spent several years at Leeds University, U.K. during his Master degree by research and research in the area of phase transformation in steels. He also has over three years teaching experience as an Assistant Professor at GIK Institute, Pakistan and has several years' industrial experience. His area of research at the CENT, KFUPM is synthesis of nanostructured composites, materials, light metals/composites and characterization of synthesized and sintered materials.