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### Zirconia / Alumina ceramics with cellular structure for Biomedical applications

It has been studied a porous ceramic obtained from nanopowders obtained by plasma spray technique. The porosity of ceramic was 5 - 75 %. The aim of the work is the investigation of densification, structure and mechanical properties of materials based on zirconia-based powders produced by plasma spray synthesis and sintered at different temperatures. It has been shown that structure of the sintered ceramic has a system of cell and rod elements. These structures formed by stacking hollow powder particles. There were three types of pores in ceramics: large cellular hollow spaces, small interparticle pores which are not filled with powder particles and the smallest pores in the shells of cells. The cells generally did not have regular shapes. The size of the interior of the cells many times exceeded the thickness of the walls which was a single-layer packing grains. The increase of the pore space in

the ceramics was accompanied by the decrease of the average size of voids inside the cells and the average grain size. The stress-strain diagrams for ceramics with porosity higher than 20 % are non-linear, and sintered ceramic with a high porosity has a very similar behavior as compare with natural bone and can be used as perspective material for bone replacement.

#### Speaker Biography

Sergei Kulkov received his Ph.D. degree from Tomsk State University in 1981 and doctoral degree in 1990 from Institute of Strength Physics and Material Sciences of Russian Academy of Sciences. From 1981 to till today, he worked firstly as researcher and head of ceramic composites laboratory in ISPMs RAS and from 1992 as a professor and from 2000 as head of department in Tomsk State University. His current research interests include synthesis and mechanical properties of MMC and CMC with phase transformations and the development of functional materials for different applications.

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