STUDIES OF BULK AND NANO CERAMICS AND GLASSES USING THERMOMECHANICAL ANALYSIS

Kristina Lilova
Setaram
Danilo Massaki Oshima(1); Kristina Lilova(2); Link Brown(3);
Oshima, D.M.(1); Lilova, K.(2); Brown, L.(2);
(1) Dx; (2) ST;

The thermomechanical analysis (TMA) includes measuring the sample deformation under certain load or measuring the change in one of the dimensions (shrinkage or expansion) as a function of the temperature. SetSYS Evo 2400 C TMA is based on a complete modular thermal analysis platform with a vertical design and a preferred system for advanced analysis. In addition to the standard characterization of the mechanical properties of solid ceramics under varied stress, it is particularly suitable for powders, which cannot be prepared as tight sintered pellets. Several examples will be presented to illustrate the application: a study of a nanocomposite (yttria-stabilized zirconia with MWCNTs); controlled sintering of alumina, hydroxyapatite, and Ti-hydroxyapatite composites illustrate some applications. Another example is the viscosity of Ba-B-Si-Al-O glass, which was determined by indentation creep test. A compression mode TMA technique was used to reproduce the temperature profile of furnace used in industry for sintering of refractory clay.