

**Determination of mechanical properties of a dental ceramic nanostructured
based of lithium disilicate $\text{Li}_2\text{Si}_2\text{O}_5$**

Z. Biskri, M. Boucheur, B. Rahal

Unité de recherche sciences des matériaux et applications, Département de Physique, Faculté des Sciences Exactes, Université Constantine 1, Constantine 25000, Algérie.

Email : biskriz@yahoo.fr

Abstract

The study and use of nanostructured materials experiencing considerable growth due to their special properties. All major types of materials are concerned: metals, ceramics, dielectrics, magnetic oxides, polymers, etc. Due to their stability in the oral environment and almost perfect imitation of a natural tooth, dental ceramics microstructured proven for decades. However, in the context of research on new dental materials and still no metal in order to improve their intrinsic properties, new dental ceramics nanostructuées are currently the subject of much research due to their physical and mechanical properties. In this context we have worked on a glass-ceramic to basis of lithium disilicate ($\text{Li}_2\text{Si}_2\text{O}_5$) using IPS E-Max system to determined the mechanical properties of this nanomaterial. For this, we have been used in the first party (party experimental) the diffractometer (XRD) and the apparatus of the differential scanning calorimetry (DSC), in order to identify the crystalline phase and measured the particle size. In the second part we have calculated some mechanical properties such as elastic constants C_{ij} , Young's modulus E, shear modulus G, bulk modulus B and Poisson's ratio ν , using a calculation software based on the theory of functional density, referred to as "DFT" (density functional theory) with the LDA and GGA approximation.

Keywords : Nanomaterial; Dental ceramic; Lithium disilicate; IPS E-Max System.