

The crystallization behavior and size effects of lithium disilicate in dental ceramics

Jae Sue Shin, T. N. Kim, Ping Ye Deng*

Div. of Advanced Materials Eng., Paichai Univ., Taejon, Korea.

* Dept. of Mat. Sci. & Eng., Tsinghua Univ., Beijing China.

Abstract

The comprehensive mechanical properties of lithium disilicate (LS2) makes it used as a potential dental material, and the fine crystal nucleation of LS2 is a current focus. It's found that the heat treatment and composition have an essential role in the nucleation and following growth process. Since the crystal size and orientation changed dramatically after heat treatment, the possibility of arranging the microstructure can be obtained by applying particular heat treatment on a certain compositions

Our work concerns changing crystal nucleation and growth behavior by undertaking various heat treatment process and try to obtain the fine LS2 crystal structure. The original glass ingredient compose Li_2O , SiO_2 , MgO , ZnO , Al_2O_3 , and some additives, the raw material was melted at 1400°C and then quenched in water, and powder of glass was prepared with grinding. The powder mixed with starch as binder was pressed into discs. Then the discs were heat-treated at various temperature and time. Finding the remarkable difference in the microstructures after various procedure, and it will be presented the idea of arranging the microstructures of the artificial tooth. SEM and XRD were used to observe and determine the matrix, respectively. Our work shows that it is practical, and can be achievable.