Nano-crystalline diopside synthesized using mechanical activation process as a novel bioceramic to use medical purposes; preparation and characterization. / R. Ghasemi, H. Gheisari, E. Karamian, M. Abdellahi, N. Rafiei. / Nano Studies. – 2015. – # 12. – pp. 43-52. – eng.

Diopside ($CaMgSiO_6$) belongs to the group of silicate biomaterials which helps osteoblasts to grow and differentiate. In this research, diopside powder was synthesized by mechanical activation method as a solid state process. Samples were composed of a blend of calcite, silica and MgO powder with 26, 55.5 and 18.5 wt. %, respectively. The materials were milled by high energy ball mill using ball-to- powder ratio 20 : 1 and rotation speed of 600 rpm for 4, 8 and 10 h. The mixture mechanical activated has been heated at 1100 ° for 2 h. XRD, SEM and BET performed on the samples to characterize. According to XRD results, the patterns show that diopside phase, with crystal size of 30 – 50 nm, were appeared in the sample mechanical activated for 8 and 10 h. Energy transferred to starting materials (23.9 MJ / g), leads to the synthesis temperature reduces to 1100 °. Fig. 10, Tab. 1, Ref. 8.

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