

Synthesis and Characterization of Akermanite Nanoparticles (AMN) as a Bio-Ceramic Nano Powder by Sol-Gel Method for Use in Biomedical

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Abstract : Natural Akermanite (NAM) has been successfully prepared by a modified sol-gel method. Optimization in calcination temperature and mechanical ball milling resulted in a pure and nano-sized powder which characterized by means of scanning electron microscopy (SEM), X-ray diffraction (XRD), transmission electron microscopy (TEM) and Fourier transform infrared Spectroscopy (FT-IR). We hypothesized that nano-sized Akermanite (AM) would mimic more efficiently the nanocrystal structure and function of natural bone apatite, owing to the higher surface area, compare to conventional micron-size Akermanite (AM). Accordingly, we used the unique advantage of nanotechnology to improve novel nano akermanite particles as a potential candidate for bone tissue regeneration whether as a per implant filling powder or in combination with other biomaterials as a composite scaffold. Pure Akermanite (PAM) powders were successfully obtained via a simple sol-gel method followed by calcination at 1250 °C. Mechanical grinding in a ceramic ball mill for 7 hours resulted in akermanite (AM) nanoparticles in the range of about 30- 45 nm.

Keywords : biomedical engineering, nano composite, SEM, TEM

Conference Title : ICBE 2016 : International Conference on Biomedical Engineering

Conference Location : Montreal, Canada

Conference Dates : July 14-15, 2016