Effect of Particle Size on the Physical and Mechanical Properties of Nano HA/HDPE Bio-Composite for Synthetic Bone Substitute

Dr.Amin D.Thamir
Production & Materials Engineering Department, University of Technology / Baghdad
Email:Dr.Amin@Uotechnology.

Dr.Jafar.T.Al-Haidary
Production & Materials Engineering Department, University of Technology / Baghdad

Jenan Sattar Kashan
Production & Materials Engineering Department, University of Technology / Baghdad

Received on: 11/11/2012 & Accepted on: 7/3/2013

ABSTRACT

The effect of using nano particle size of Hydroxyabatite to produce HA/HDPE bio-composite by Hot Pressing technique was studied by investigating the effect of particle size and production technique on the physical and mechanical properties of the bio-composite at different volume fraction of nano HA powder and different compression pressures.

Nano particle size and Hot Compression technique had great impact on the properties by reversing the behavior of the bio composite comparing with that using micro scale particle size in some of previous studies .The fracture strength and hardness increased with increasing the filler content by more than 200% for strength and 300-400% for micro hardness values , the densities increased with increasing filler content compressing pressure where as the porosity decreased.

The modification in mechanical properties due to filler particle size and production process enhanced the osteo- conductivity of biomaterial to use in different bone substitute applications.

Key words: Nano hydroxyabatite, Biomaterials, Mechanical Properties, Synthetic Bone Substitute.
Effect of Particle Size on the Physical and Mechanical Properties of Nano HA/HDPE Bio-Composite for Synthetic Bone Substitute

When using a sample of different size, when using a sample with a high density, twisting the sample caused a high increase in the properties. When comparing the density of the sample at the same density, when using a sample of the same density, the density of the sample containing nano HA/HDPE at 300-400% of the sample density of the sample is equal to the sample density. As a result, the sample was increased, and the physical and mechanical properties of the composite increased.