Proses Pembuatan dan Karakterisasi Bopmaterial Functionally Graded Material Hydroxyapatite- Sutra dengan Teknik Pulsa Electric Current Sintering

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Abstrak

This research was intended to produce functionally graded material (FGM) of Hydroxyapatite (Hap)-silk fibroin by pulse electric current sintering in facing the need in biomaterial application. Silk sheet was utilized as a bound between each layer. The target sample thickness was 1.6 mm with diameter I5 mm. Sample was created by using cylindrical type of carbon die and consisted of 4 layers with the same thickness in which silk film with the thickness of 100 ,tan was placed between the layers. The composition of lower layer was l 00% silk fibroin, second layer was 90% silk fibroin + l 0% Hap, third layer was 80% silk fibroin + 20%Hap, and 70% silk fibroin + 30% Hap for the upper layer. The properties of FGM was characterized by optical microscope and scanning electron microscope (SEM). Three point bend with single-edge beam was used for _fracture toughness test (lim). The grade of the FGM material was proven by using electron probe micro analyzer (EPMA). The value of fracture toughness was 0. 65 l MPo.m". The silk film in the borders of the sample can arrest the crack perfectly, so that sudden fracture could be avoided The sample still remained capable supported the load after maximum load was reached Optical micrograph and SEM indicated that the Hap-silk fibroin FGM could be produced by using the method that was introduced in this research.