

Silvyana Chorry, 2019, Efek Penambahan ZnO Nanopartikel Terhadap Karakteristik Hidroksiapatit Berpori Sebagai Kandidat *Bone Filler*. Skripsi dibawah bimbingan Drs. Djoni Izak R., M.Si dan Jan Ady, S.Si, M.Si., Program Studi S1 Fisika, Departemen Fisika, Fakultas Sains dan Teknologi, Universitas Airlangga, Surabaya.

Abstrak

Telah dilakukan penelitian sintesis dan karakterisasi hidroksiapatit berpori dengan variasi penambahan ZnO nanopartikel menggunakan metode perendaman busa. Penelitian ini dilakukan untuk mengoptimalkan karakteristik hidroksiapatit berpori sebagai kandidat *bone filler* dengan cara memberi variasi penambahan ZnO nanopartikel. Bahan yang digunakan dalam penelitian ini meliputi hidroksiapatit, ZnO nanopartikel, PVA dan busa *polyurethane*. Pembuatan dilakukan dengan merendam busa *polyurethane* ke dalam *slurry*. *Slurry* dibuat dari campuran hidroksiapatit, PVA, dan variasi penambahan ZnO nanopartikel (14 wt%, 16 wt%, dan 18 wt%). Kemudian sampel diberi proses *thermal treatment*, meliputi pengeringan pada temperatur 80° C selama 2 jam, proses penghilangan PVA dan busa *polyurethane* pada temperatur 650° C, kemudian dilakukan proses sintering pada temperatur 1200° C dengan waktu tahan 3 jam. Berdasarkan analisa SEM, uji porositas, dan uji kuat tekan, hasil terbaik ditunjukkan oleh sampel III yaitu hidroksiapatit berpori dengan penambahan ZnO 18 wt% karena memiliki diameter pori sebesar 106 - 353µm dengan nilai kuat tekan 3,4 MPa, persentase porositas 69,4%, dan tidak toksik. Hasil ini menunjukkan bahwa penambahan ZnO nanopartikel dapat mengoptimalkan karakteristik hidroksiapatit berpori sebagai kandidat *bone filler*.

Kata kunci : *hidroksiapatit berpori, ZnO nanopartikel, slurry, metode perendaman busa, sintering, porositas, diameter pori, kuat tekan, tidak toksik.*

Silvyana Chorry, 2019, Effect of Composition Variation in ZnO Nanoparticles Addition on Characteristic of Porous Hydroxyapatite as *Bone Filler* Candidate. The Final Assigment under guidance of Drs. Djoni Izak R., M.Si and Jan Ady, S.Si, M.Si., Physics Study Program, Physics Departement, Faculty of Science and Technology, Airlangga University, Surabaya.

Abstract

Synthesis research and characterization of porous hydroxyapatite have been carried out by variation of the addition of ZnO nanoparticles using foam immersion method. This research was conducted to optimize the characteristics of porous hydroxyapatite as a *bone filler* candidate by increasing composition variation of ZnO nanoparticles. The materials used in this study include hydroxyapatite, ZnO nanoparticles, PVA and polyurethane foam. Samples were prepared by soaking polyurethane foam into the slurry. Slurry is made from a mixture of hydroxyapatite, PVA, and variations in the addition of ZnO nanoparticles (14 wt%, 16 wt% and 18 wt%). Then the sample was given a thermal treatment process, including drying at a temperature of 80° C for 2 hours, PVA and polyuethane foam removal process at a temperature of 650° C, then given the sintering process at 1200° C with a holding time of 3 hours. Based on SEM analysis, porosity test, and compressive strength test, the best results are shown by sample III , namely porous hydroxyapatite with the addition of ZnO 18 wt% which has pore diameter of 106-353 μm with a porosity percentage of 69.4%, compressive strength of 3.4 MPa, , and not toxic. The results are presented that the addition of ZnO nanoparticles can optimize the characteristics porous hydroxyapatite as bone filler candidate.

Keywords: *porous hydroxyapatite, ZnO nanoparticles, slurry, foam immersion method, sintering, porosity, pore diameter, compressive strength, not toxic.*