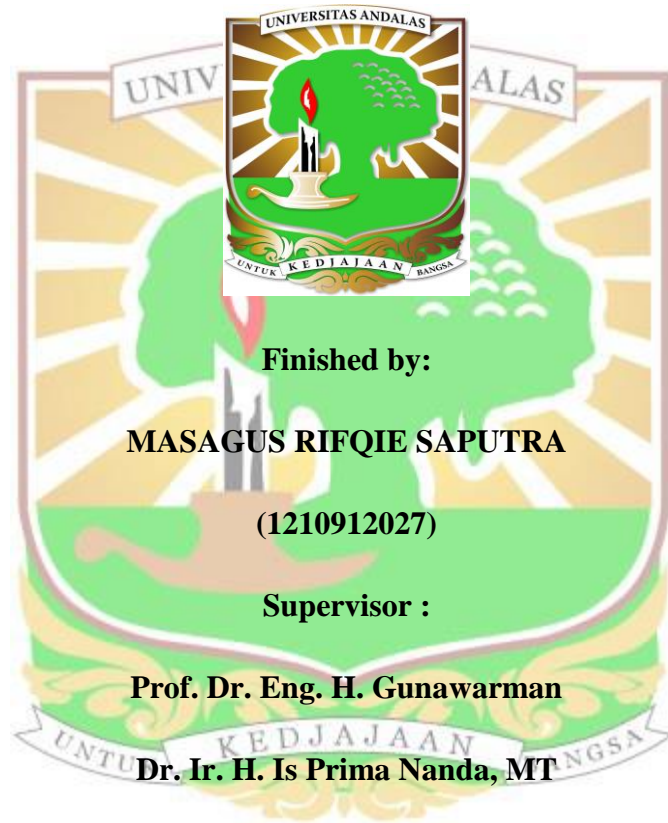


FINAL PROJECT

“Microstructure Analysis of Hydroxyapatite Coating on Stainless Steel 316 L Using Investment Casting Technique In Implant Application”



MECHANICAL ENGINEERING

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MICROSTRUCTURE ANALYSIS OF HYDROXYAPATITE COATING ON STAINLESS STEEL 316 L USING INVESTMENT CASTING TECHNIQUE IN IMPLANT APPLICATION

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ABSTRACT

The number of traffic accident and osteoporose cases which caused bones fracture in Indonesia has increased. One of solution to human bones fracture is producing an orthopaedic implant material which has the same characteristics and heal human bones. Stainless Steel 316 L is the material with high corrosion resistance, biocompatibility, and has a superior mechanical properties. It needs hydroxyapatite as supporting material which has the similar characteristics and has a good interaction with human bones and increase the bioactivity. Research about coating the hydroxyapatite on Stainless Steel 316 L is needed.

In this research, coating hydroxyapatite on Stainless Steel 316 L using investment casting technique which is biometallic coating, practical, simple and economics. In journal before, hydroxyapatite coating on mould used a dipping method and finished with sintering process at 800 °C – 1000 °C.. This research used a hydroxyapatite coating with pouring method and observing the optimum sintering temperature between 850 °C, 900 °C, and 950 °C. And the hydroxyapatite coated on specimen observed by Optical Microscope, Scanning Electron Microscope (SEM), Energy Dispersive X-Ray (EDX), Vickers Hardness Tester.

With Investment Casting, hydroxyapatite successfully coated on the Stainless Steel 316 L specimen. Pouring method produce an uncontrolled hydroxyapatite thickness (spongy and porous surface) with produced 60 µm – 110 µm hydroxyapatite thickness. On the other hand, the increasing temperature made the increasing micro – hardness number and the change in purity of hydroxyapatite, but temperature is not related to the hydroxyapatite thickness in this process. And the optimum sintering temperature observed at 900 °C which produce the best purity composition of calcium and phosphate ratio.

Key words : Coating, Stainless Steel 316 L, Hydroxyapatite, Investment Casting