Analysis of oxide inclusions on medical grade 316l stainless steel using local raw

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Abstrak

The type of stainless steel that is most commonly used in bone implants is austenitic 316L stainless steel, which has an excellent corrosion resistance and high strength. The Center for Materials Technology, BPPT, in cooperation with a local industry, is currently undertaking research into integrating, refining and alloying processes for the production of medical grade 316L stainless steel, using raw material originating from the ferronickel of Pomalaa. Natural resources of ferronickel, one of the main raw materials for stainless steel, are locally available in Indonesia. Other alloy metals such as steel scrap, ferro chrome and ferro molybdenum are bought in the market. The charging calculation is done by computer-aided simulation, before the melting processes are carried out. The melting facility used is an induction furnace of 250 kg capacity, following the procedures commonly used in the industry. Chemical composition analysis is done by a spectrophotometer. Tensile and hardness tests are conducted, and a microstructure observation is also carried out using an optical microscope and a scanning electron microscope. The selection of raw material inputs and refining and annealing processes affect the quality of the alloy. In our study, we found various forms of oxide inclusions in the stainless steel microstructure: triangular, hexagonal and spherical. The tensile strength of the specimen of 316L stainless steel casting materials was influenced by the presence of oxide phases.