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Change the surface tension of the electrolyte to evaluate the effect of electro polishing on porous materials with different pore sizes

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In recent years, 3D printing technology has been applied widely and lots of medical devices such as implants were fabricated by 3D printing technologies. Materials that implanted in human body are usually made into a porous shape in order to improve bone ingrowth. The shape of porous biomedical materials are usually complex and with a hole size of only several hundred micrometers. It is difficult to polish the surface of the struts by using a conventional post-processing method and it is learned that electro polishing is the most effective method to conduct the post surface treatment. Generally, it's too difficult to make the electrolyte go through the small pores, which sizes are only a few hundred micrometers. Therefore, different concentrations of surfactants will be added to the electrolyte to reduce the surface tension, so that the electrolyte can penetrate into the porous structure and the struts in the porous materials could all be infiltrated in the electrolyte. In this study, titanium alloys (Ti64) which are widely used as biomedical materials were printed by using selective laser melting (SLM) technology. In the experiment, oleic acid was used as the surfactant. The hole size is designed from 300 m to 700 m and the concentration of electrolyte is 0% (no oleic acid added) to 100% (saturated) oleic acid. In this study, different ratios of oleic acid were added to the electrolyte and the relationship of the electrolyte with different concentration of oleic acid, pore size of the porous materials and the surface roughness of the struts inside the porous materials is explored and discussed in detail.

Biography

Y P Wang is pursuing her MS in Department of Bioinformatics and Medical Engineering at Asia University, Taiwan. Her research topic is focused on the post treatment R&D of 3D printed parts.

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