Optimization of plasma electrolytic oxidation process parameters for modification of Ti6-Al4-V structure.

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Plasma Electrolytic oxidation is one of the novel coatings techniques for deposition of ceramic coatings on metals. One advantage of this process is it's significant influence ostego-integration.one of key parameters in osteo-integration is percentage of pores in the structure. Optimization of this process is a matter of importance specially in Bio-medial applications. In this Study Taguchi,s method was applied as a design of experiments method to produce the most corrosion resistant surface on Ti6Al4V.

Four varying parameters were selected: Voltage, Time, concentration of Na3P6O18 and concentration of Na2SiO3 . Scanning electron microscopy (SEM) and celemx Image analyzer software was used to determine percent of pores in each sample. Results of standard analysis using one time experiment with respect to interference of parameters indicates that parameters existing in orthogonal taguchi array have a significant effect on this process. Optimized parameters were determined. The percentage contribution of each parameter is determined using ANOVA magnitude analysis and it shows that Voltage has the strongest effect among four parameters.

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