EFFECT OF THE SURFACE TREATMENT WITH Nd: YAG LASER ON THE WEAR RESISTANCE OF CoCr ALLOY.

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Wear resistance in metal- metal joint prostheses remains widely studied, due to the detached debris that causes the implant loosening failure. The present work aims to explore the tribological behavior of the modified surface using a pulsed Nd: YAG laser with different parameters such as power, speed and spot diameter. The microstructural analysis of the laser modified surface were characterized using metallographic techniques, scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS), atomic force microscopy (AFM), X- ray diffraction (XRD), and Nanoindentation test. A pin- on- disc tribometer was used to evaluate the wear performance of the remelted surface under dry sliding condition. The results showed that typical interdendritic structures in the as cast identified as secondary phases $M_{23}C_6$ eutectic were refined due to the heat input and fast cooling rate during the laser treatment. The refined microstructure showed an enhancement in the tribological performance, increasing the wear resistance. The correlation among the laser parameters, microstructural effect and the influence in the wear resistance is discussed.

Keywords: Laser surface treatment, CoCr alloy, Microstructure

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