Wear of SLM AISI 316L stainless steel for biomaterials application

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The laser techniques usage on the biomaterial's field includes welding, engraving, cutting and texturing. The present study evaluated the influence of laser texturing process on the tribological behavior of AISI 316L austenitic stainless steel (SS) on the friction coefficient and wear volume in ball-cratering wear tests. The laser texturing process was carried out with a nanosecond optical fiber ytterbium laser at four different pulse frequencies. Advanced selective laser melting (SLM) techniques allow the production of pieces with the most varied sizes, shapes and complex geometries. For comparison reasons, pristine surfaces were also evaluated. The sample's surfaces finishing was analyzed by laser confocal microscopy. The wear tests were carried out during 10 min, solid spheres of 52-100 chrome steel, with 2 mm in diameter, were used as counter-bodies. The results indicated that the tribological behavior is influenced by the laser additive manufacturing (AM) process parameters used for this biomaterial, and the wear rate is dependent of the normal force and the roughness of each specimen.