

Magnetic Susceptibility of a Laser Treated Biomaterial

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Austenitic stainless steel ISO 5832-1 is widely used as biomaterial due to its mechanical properties, chemical composition, degradation resistance and low cost. In this work, we evaluated the magnetic susceptibility of samples of this biomaterial, with laser texturing surface treatment in four different pulse frequencies, as well as samples without laser treatment, for comparison purposes. Relative magnetic permeability (μ_r) measurements were performed on a magnetic susceptibility scale. A Bruker magnetic force microscope (MFM), model SPM Multimode 8, with analysis processing software Nanoscope Analysis, was used in the Tapping Mode operation to perform naturally generated magnetic field measurements on the laser textured samples surfaces. The treatments affected the magnetic susceptibility of these surfaces, which was higher for the textured samples when compared to the other surface finishing conditions, which is undesirable for a biomaterial. The magnetic field evaluations by MFM are of qualitative character. Qualitatively distinct images of amplitude and phase difference signals were noted. This fact proved the results obtained by the technique of measurement of magnetic signals by precision scale. The analysis of the images obtained by MFM suggested that the parameters variation for laser texturing resulted in variation of intensities and distribution of magnetic field signals on this biomaterial's surfaces.