MICROSTRUCTURAL CHARACTERIZATION OF FE-35MN ALLOY

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SUMMARY

In the recent years, the development of temporary metallic implants from biodegradable biomaterials as iron and its alloys has been the subject of several studies. Those biomaterials allow that the implant degrade gradually after serving its purpose, eliminating the risks of complications associated to a permanent implant (DARGUSCH et al., 2019). Iron is particularly attractive on the structural side and with the addition of manganese has shown a big potential for applications in biodegradable implants, especially in cardiovascular stents (CONTI et al., 2018). Fe-Mn system alloys have been widely discussed from Hermawan et al. (2010) investigations that reported the obtaining adequate mechanical properties and a higher degradation rate than pure iron, adjustable from the manganese concentration. Several authors agree that Fe-35Mn alloy exhibits a set of mechanical, magnetic and of degradation properties that become it the best choice in the Fe-Mn system (DARGUSCH et al., 2021). The purpose of this research is evaluate through microstructural characterization the influence of the addition of 35% Mn to iron. The Fe-35Mn experimental alloy was obtained by arc melting furnace under an argon atmosphere, homogenized at 1000 °C for 86,4 ks, worked by hot swaging alternating heating ingots to 850 °C and gradual passes with several hammers and quenched in water at 1000 °C for 10.8 ks. For microstructural characterization, it was employed optical microscopy, x-ray diffraction and microhardness techniques. The average size of the grains were measured using the

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imagej software. The results indicated that with the presence of Mn, the system started to present predominance of austenite phase, with typical microstructure composed mainly of equiaxed and relatively large grains, uniformly distributed after the processing route established. Due to the high ductility and low strength of this phase, the microhardness value of the alloy decreased.

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