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MICROSTRUCTURAL CHARACTERIZATION OF ZR1NB ALLOY AFTER HOT ROLLING

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The different research lines within the scope in engineering and materials science have developed new materials that can be used in different industrial sectors, such as, energy, health and transportation. For the nuclear industry, for example, the Zr alloys, are of great interest due to its good mechanical properties, excellent corrosion resistance and above all, the high permeability to thermal neutrons. In the health sector, the zirconium poses one of the lowest Young's modulus when compared to other metallic biomaterials, e.g., pure Zr is 68 GPa, bone mineral hydroxyapatite is 80 GPa, for Ti alloys is 90 GPa and above, for Nb is 105 GPa and stainless steels above 189 GPa. This is particularly important for implants in bones, whose elasticity modulus can reach 30 GPa and it is desirable an as close match as possible. However, the zirconium alloys, have great chemical affinity with oxygen and nitrogen. Moreover, oxides and nitrides may form during the melting process, heat treatment and hot rolling, changing the physic-chemical properties of the alloy. This experimental work shows the results of the evolution of the microstructure after hot rolling of the Zr1Nb alloy. It was possible to confirm the absence of formation of oxides and nitrides, thus confirming the of the experimental method of melting and hot rolling of the Zr1Nb alloy.