наблюдается только для керамики, полученной из прекурсоров pH 10. Остальные образцы содержат большое количество межзеренных пор, приводящих к практически полному светорассеиванию.

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COMPARISON OF MECHANICAL PROPERTIES AND MICROSTRUCTURE OF ANNEALED AND QUENCHED Ti-6Al-4V ALLOYS

Thoemmes A.*

Novosibirsk State Technical University, Novosibirsk, Russia

*E-mail: alexander.thoemmes@outlook.de

Ti-6Al-4V alloys with different diameters (d= 3 or 5 mm) were fabricated by suction casting. The microstructure of alloys was characterized by optical microscopy and scanning electron microscopy. The different diameters lead to different cooling rates resulting in significant changes in microhardness.

Ti-based alloys, and especially Ti-6Al-4V, are widely used in aerospace, automotive or sporting goods. Up to now Ti-6Al-4V alloy is widely used in biomedicine. α + β-Ti alloys have attracted attention in medicine due to their perfect corrosion resistance, high strength to weight ratio and good biocompatibility [1].

The Ti-6Al-4V raw material used in this study was delivered in a form Ø 50 x 200 mm rolled bar. Small 20 x 20 x 10 mm^3 specimens were cut from the bar normal to rotation axis. The materials were synthesized in a BUEHLER arc furnace in an argon atmosphere. To eliminate the as-cast microscopic segregations the annealing procedure was carried out in vacuum furnace at 900 °C for 24h followed by cooling in the furnace.

The microstructures were examined using an optical microscope (Carl Zeiss Axio Observer Z1m). Scanning electron microscopy (SEM) was conducted using a Carl Zeiss EVO 50. The hardness measurements, an average of 30 readings, were carried out using a WOLPERT Group 402 MVD Vickers hardness tester under a load of 50 g and a dwell time of 10 s. Synchrotron X-ray diffraction (SXRD) was conducted at the P07 beamline of the "Deutsches Elektronen Synchrotron" in Hamburg, Germany. Diffraction patterns were recorded by a 2-dimensional (2D) image plate detector with 2048 x 2048 pixels centered on the beam. An X-ray wavelength of λ = 0.124 Å or 0.142 Å and a beam cross section of 0.5 x 0.5 mm² were used. The sample-to-detector distance and diffraction center were calibrated at RT using a LaB6 powder. Azimuthal integration was carried out over the entire 360° to minimize potential effects of texture and grainsizes. The peaks in the diffraction patterns were fitted using Pearson-VII function and the peak parameters were calculated using least square method.

The weight loss of the samples was found to be between 0.01 and 0.56 % which indicates that the composition of the suction casted alloys was close to the nominal composition. The optical and scanning electron micrographs of rapidly solidified alloys exhibited a dual phase morphology. The maximal microhardness of 340 $HV_{0.05}$ was achieved in the sample with a diameter of 3mm. It is assumed that the high cooling rate during suction casting led to the formation of metastable β phases.

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STRUCTURE AND PROPERTIES OF Ti-Nb ALLOYS FABRICATED BY SUCTION CASTING

Thoemmes A.[1*]

[1)] Novosibirsk State Technical University, Novosibirsk, Russia

*E-mail: alexander.thoemmes@outlook.de

Ti-Nb alloys were fabricated by suction casting. The microstructure of alloys was characterized by optical microscopy and scanning electron microscopy. The content of Nb varied in the range 25-35 mass % leading to significant changes in microhardness.

Ti-based alloys, and especially Ti-6Al-4V, are widely used in aerospace, automotive or sporting goods. Up to now Ti-6Al-4V alloy is widely used in biomedicine. However, due to potential toxicity of Al and V a new generation of Ti alloys with Nb or Ta is under particular review [1]. β-Ti alloys have attracted attention in medicine due to their perfect corrosion resistance, high strength to weight ratio and high biocompatibility.

In this study, the binary Ti-Nb alloys with Nb content from 25 to 35 mass % (hereafter "mass %" will be referred to as %) were prepared from commercially pure (c.p.) Ti and Nb. The materials were weighted according to the nominal composition. The materials were synthesized in a BUEHLER arc furnace in an argon atmosphere. A titanium ingot was used as an oxygen getter and was melted prior to each melting procedure. Considering the big difference in density (Ti:4.5 g/cm³; Nb: 8.57 g/cm³) and melting point (Ti: 1941 K; Nb: 2750 K) of the initial elements the alloys were remelted 16 times and flipped 7 times (after each second remelting). The weight loss of the samples during melting was evaluated by weighing the initial materials and the samples after melting. The microstructures were examined using an optical microscope (Carl Zeiss