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EVOLUTION OF THE MICROSTRUCTURAL PARAMETERS OF COLD WORK Ti-6-Al-4V ALLOY.

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Abstract: AbstractThe aim of this work is to investigate cold worked Ti-6Al-4V (?+?) alloy. The alloy was examined by X-ray diffraction using Rietveld refinement method. MAUD software (Materials Analysis Using Diffraction) was used to analyze the microstructural parameters evolution (crystallite size, root mean square strain (r.m.s) and dislocation density. The Crystallite size is smaller in the ?-phase compared to the ?-phase. Microstrain and dislocation density are higher in the ?-phase than those found in the ?-phasefor the as received material. The microstructural parameters of Ti-6Al-4V alloy exhibit typical values of cold deformation state. The results show that the deformation process reducesthe crystallite size (coherent diffraction domains) from 520 to 210 ? in the ?-phase. Consequently, the r.m.s increases from 5 E-4to 32 E-4and the dislocation density increases from 2.92 E+10to 4.6 E+11m-2after 85 % thickness reduction.

Keywords : Ti-6Al-4V alloy, cold working, crystallite size, dislocation density