

Estimate the crystallite size for nanocrystalline AISI 316L stainless steel and Armco iron processed by hydrostatic extrusion using variable energy positron beam

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The paper presents the results of research of nanocrystalline AISI 316L type stainless steel and nanocrystalline Armco pure iron processed by severe plastic deformation using hydrostatic extrusion method. Surface and subsurface of the steel samples extruded at different pressure were investigated using variable energy positron beam. It enabled us to determine the positron diffusion length and compare its values with those for annealed AISI 304 stainless steel. Furthermore positron lifetimes and microhardness were measured for all the samples and X-ray diffraction was used to estimate the crystallite size.

Key words: stainless steel, Armco iron, plastic deformation, hydrostatic extrusion, variable energy positron beam, X-ray diffraction