s8.m28.p6 **Equi-Channel Angular Pressing of Zirconium: Features of Structure and Texture Development.** Yu. Perlovich, M. Isaenkova, V. Fesenko, M. Grekhov, S.H. Yu[a,b] and S.K. Hwang[a,b], [a]*Moscow Engineering Physics Institute (State University), Moscow, Russia,* [b] *Inha University, Inchon, Korea*, *E-mail: perl@phm.mephi.ru*

Keywords: Equi-channel angular pressing; Zirconium; Crystallographic texture

Equi-channel angular pressing (ECAP) is considered now as a perspective method to produce metal rods with homogeneous structure, superfine grains and increased strength. By means of advanced X-ray diffractometric methods, the detailed study of texture and structure features of ECAP Zr rods was undertaken.

Cylindrical rods Ø 10 mm were were subjected to ECAP at 350°C with number of cycles from 1 to 4. Cubic samples 3x3x3 mm in size were cut out by the electro-sparkle method from different regions of the rod's cross-section. Complete pole figures (0001) and {11.0} were constructed. For each point of PF(0001) a profile of the X-ray line (0002) was reconstructed in order to characterize the condition of crystalline lattice in grains with the corresponding orientation (ψ,φ) of basal axes. Distributions of parameters of the X-ray line profile depending on the grain orientation were constructed. Among these parameters there are the true angular half-width β, growing with an increase of lattice distortion and fragmentation of coherent domains, as well as the X-ray line angular position 2θ, determined by the interplanar spacing "c". Then the distribution β(ψ,φ) describes a structure anisotropy of rod, whereas the distribution c(ψ,φ) - elastic microstrains of the crystalline lattice within rod's grains. Comparison of data, obtained for different regions of the cross-section, allows to estimate spacial homogeneity of structure development processes within the rod under its deformation.

As a result of ECAP, the initial axial texture of the rod sharply changes and becomes asymmetric relative to the rod's axis. In consequence of the preferred orientation of contractile and tensile stresses under ECAP, the main texture components of resulting texture are characterized by the compact arrangement of basal axes within a doubled texture maximum at an angular distance of 60°-70° from the rod's axis at the outer side of L-like channel. Texture inhomogeneity of Zr rods does not change the general character of texture, but has effect on its secondary features and most of all is essential in the rod, experienced 4 ECAP passes with 90°-rotations. The capacity of Zr grains to reproduce repeatedly the same orientation by successive ECAP passes, when this orientation proved to be changed by every 90°-rotation of the rod, testifies about almost complete restoration of the plasticity resource of material at the ECAP temperature.

Studied rods are characterized by the small angular half-width of X-ray lines, showing a relatively perfect crystalline lattice of α-Zr. ECAP rods sharply differ by this feature from other deformed products of Zr-based alloys. Evidently, in the course of ECAP the recovery processes intensify in material of rods and remove the excessive distortion of its crystalline lattice. At the same time, residual elastic microstrains of α-Zr grains vary in rods within rather wide limits.

s8.m28.p7 **The Structure and Photoluminescence Properties of Al:ZnO/Porous Silicon.** Hyunah Park[a)], K. Prabakar[a)], Jae-Hee Oh[a)], Dong-Wha Park[b)], Wha-Seung Ahn[b)] and Chongmu Lee[a)], *Department of Materials Science and Engineering, Department of Chemical Engineering, Inha University, 253 Younghyun-dong, Incheon 402 751, South Korea. E-mail: cmlee@inha.ac.kr*

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Al:ZnO (AZO) were deposited on porous silicon (PS) by using the rf-magnetron sputtering technique at different rf-powers. The photoluminescence spectra of the samples before and after deposition of AZO were measured to investigate the effect of PS on the luminescence properties of AZO/PS composites. The AZO film show blue light emission and is due to the oxygen-related vacancy existing in the films. As-deposited porous silicon emits green light. The green peak of PS shows a blue shift after AZO deposition. Oxidation of Si atoms will lead to a blue shift of the emission from PS due to the additional potential modulation with the Si nanocrystallites by a long range Coulombic interaction of the oxygen ions.