

## EBSD Based Studies of Strain Distribution in Weld Joint of NiCrFe Alloy

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Electron backscattering diffraction technique (EBSD) in the scanning electron microscope has been applied for determination of local strain distributions near the cracks of NiCrFe weld joint, which appears in the areas of thermal influence. Since NiCrFe weld joints are well used in nuclear industry it was necessary to establish the reasons of formation of microcracks during the heat processing. In this study, the series of Kikuchi patterns from the local areas of specimen (40 nm<sup>2</sup>) near the crack which have been obtained using the scanning electron microscope "Zeiss" Evo-50 with CCD detector and were analyzed [fig. 1]

To minimize the subjective factors during the image processing of EBSD and X-ray patterns, the methods of direct 2-D Fourier transform was used since Fourier spectra parameters and integral intensity along cross section of Kikuchi band are related to the interplanar distances. It gave possibility to determine strain distribution in local areas of samples.

It was established that for some cracks the dependence of strain on distance from the crack has exponential character. Maximal strain values in an area around crack are distributed along the low angle boundaries of subgrains. X-ray microanalysis investigations indicate the presence of impurities (predominantly C, O atoms), which can cause the formation of characteristic microstructure (precipitates).

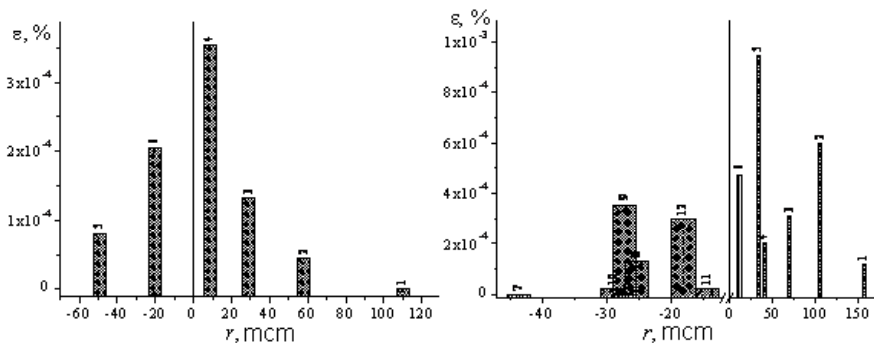


Fig 1. Strain-distance to crack dependence for two specimens from different groups.

1. Borchha M., Fodchuk I., Balovsyak S., Garabazhiv Ya., Tkach V. Phys. Status Solidi A. – 2011. – **208**, № 11. – P. 2591-2596.