

**MASS-TRANSFER AND DOPING PROCESSES OF
THE INSIDE SURFACES OF CAST IRON SLEEVES
USING THE ELECTROLYTE-PLASMA
TREATMENT**

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Abstracts

Using the Rutherford back-scattering (RBS), the elastic recoil detection analysis (ERDA) and X-ray (XRD) method of analyses, metallographic investigations and measurements of microhardness, we have studied the inside surfaces of pig iron sleeves for engines after electrolyte-plasma treatment (EPT). We have revealed doped ions of W and Cu near the surface. The thickness of the hardened layer obtained under given irradiation conditions was 3 mm, the maximum hardness increase was 7000MPa and was observed at 1.2 to 2.5mm depth from the surface. The analysis of the hardened layer structure has demonstrated the mixture of α -Fe and $\tilde{\alpha}$ -Fe phases, as well as the small-grain martensite structure with high dislocation density of 10^{12} cm^{-2} .

Keywords: electrolyte, water, plasma, mass-transfer, doping, dislocation density, martensite.