

SURFACE OXIDATION OF Fe-Si ALLOY

A.R. Lashin¹, O. Schneeweiss¹, P.Sajdl²

¹ Institute of Physics of Materials, Academy of Sciences of the Czech Republic,
Žižkova 22, CZ-616 62 Brno, Czech Republic

² Institute of Chemical Technology, Department of Power Engineering, Technická 3,
16628 Prague, Czech Republic

The phase composition at surface of bcc Fe₉₄Si₆ alloy was investigated in dependence on heat treatment. The phase analysis of the samples annealed in vacuum and/or oxygen atmosphere was based on Mössbauer spectroscopy and photoelectron spectroscopy (XPS) measurements. Conversion Electron Mössbauer spectra (CEMS) were taken using gas-filled electron detector with normal incidence of the gamma radiation. Mössbauer spectra were also measured in scattering geometry with detection of 14.4 keV gamma radiation using a 2 π proportional counter. Photoemission spectra were taken using ESCA equipment using 1.486 keV X-ray radiation.

The XPS data showed the depth profile of oxygen concentration after polishing, etching and annealing in vacuum. This is compared with phase analysis derived from CEMS spectra, which showed α -FeSi, α -Fe, fayalite, and low amount Fe³⁺ in the surface layer. This result was compared with the phase compositions at surface of the samples annealed in oxygen atmosphere.

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