

Effect of chemical regimes on oxide layers of materials in power engineering

Jana Poláčková, Petr Sajdl, Jana Petřů, Daniela Marušáková Institute of Chemical Technology, Prague/Czech Republic; Jana Poláčková

The aim of this paper is improvement of current state in corrosion protection of metallic materials in power engineering. These are especially stainless steels. Temperatures and pressures in systems are currently increased due to achieve higher efficiency. In some plants are applied even supercritical values. Except new materials (titanium, nickel superalloys), different types of surface treatments or layers are used to reduce problems caused by corrosion. If passive film is formed on treated surface, e.g. nitrided, there can be differences in its properties beside usual layer. Oxidic layers are common, however in operation of water-steam cycles in power plants arise problems like exfoliation, bigger porosity or disparity of passive layer. Consequence is larger corrosion rate, which leads up to degradation of the material and failure of equipment.

In experimental section were created oxidic layers in laboratory conditions and the behavior of materials commonly used in power industry was monitored. Thereafter were evaluated their properties and composition, which permits to analyze what terms are for given materials most suitable. Samples were exposed in autoclave in terms of different cycle chemistry and then analyzed by method of ESCA, X-ray diffraction and metallography.