

INFLUENCE OF GAS DIFFUSION SATURATION OF SURFACE ON MATERIAL'S PLASTICITY

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Development and application of various methods of construction elements' strength characteristics improvement by treatment and sputtering of their surfaces by some substances can appreciably modify the modern materials. These methods of treatment lead to the technological structural inhomogeneity of the construction elements. Thus it is important to study physical, chemical and mechanical properties of such elements. Among the progressive techniques of physical-mechanical characteristics improvement we can name the focused radiation-beam furnish of surfaces. It changes the structure of surface layers and makes the sample to be inhomogeneous across its section. The aim of this work is the study of the influence of gaseous medium (at hand ammonium, nitro-hydrogen, nitro-hydrogen-ammonium and argon) on a creep of molybdenum for high temperatures. The techniques of experimental investigation lays in determination of sample's durability in zone of high-temperature corrosive gaseous medium under uniaxial loading. Experiments for investigation of strength characteristics of molybdenum under the physical fields were conducted on modernized apparatus designed in Institute of Strength Problems of NASU. For the experiments we take flat samples of chemically-pure molybdenum of 110x5.7x0.5 mm. Highly refined gas mixture is pumped into optically transparent reactor of quartz (with the sample in it) that was in one of the focuses of ellipsoid mirror heating chamber. The sample was heated by focused radiation-beam technique to 600°C. In 30 mm temperature in heating zone was 1000°C. The loading on sample was stepping and the creep diagram was automatically recorded. In experiment the series of samples was divided on some equal parts, each of them was tested under the different physical fields. Duration, level and intensity of loading for every part of samples are determined experimentally. The results for every chosen factor are analyzed and compared with standard part tested in inert medium (argon) under the loading temperature conditions.

KEY WORDS: corrosive gas, creep, high-temperature, molybdenum

MAGNETIC DRUM SEPARATOR FOR REMOVAL OF FERROMAGNETIC IMPURITIES FROM SUGAR

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According to the current standards (The State Standard of Ukraine N4623-2006 «White Sugar. The Technical Specification») the mass fraction level of ferromagnetic contaminants in white sugar should not exceed 3 mg per 1 kg of the product.

In Ukrainian National University of Food Technologies (Electric Power Supply and Management Department) on the base of previous scientific researches of magnetic field lines configuration and values of electromagnetic forces on ferromagnetic impurities of different sizes in magnet separators work area depending on their poles geometry, the series of magnetic separators were developed for removal of ferromagnetic impurities from granular materials of different food productions (see USSR Inventor's Certificates №1558478, January 26, 1988, №1724375, December 08, 1991 and Patents of Ukraine №13799A, April 25, 1997; №14617A, January 20, 1997; №14897A, February 18, 1997).

In the past years, an experimental model of electromagnetic drum separator for removal of ferromagnetic impurities from sugar has been designed and constructed. Separation efficiency of this device is 5000 kg of sugar per hour. This separator has specific pole geometry for creating high gradient of magnetic field and its concentration on the working area surface for providing sufficient forces of removing even low magnetic contaminants from the sugar flux. The rotation of the drum creates the conditions for guaranteed removal of ferromagnetic impurities in the discharge zone, where the magnetic field is absent. Separation quality complies with current standards.

KEY WORDS: magnetic drum separator, ferromagnetic contaminants in sugar