pletely disordered state as a result of the rapid growth of the meta-modification concentration (S = 2) with decreasing temperature. The possibility of the latter transition was discussed earlier in [17, 18]. The increase of the lattice parameter as a result of the increased meta-modification concentration [19] was observed in our experiments starting approximately with 12°K, which agrees with data on neutron scattering [20], which show that this value of T corresponds to a minimum content of the meta-modification. The influence of the conversion on the behavior of the lattice parameter in the temperature interval investigated by us becomes quite clearly pronounced when the obtained curve is compared with the plot for samples containing several thousandths of a per cent of O_2 (Fig. b). At the low conversion rates typical of these oxygen concentrations, the $\Delta a(T)$ plot does not show the sections with negative expansion coefficient, which are typical of equilibrium samples.

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ELECTRON EMISSION IN THE TRANSITION TO THE SUPERPLASTICITY STATE

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Electron emission was observed when the superplastic state set in and developed in metastable eutectics.

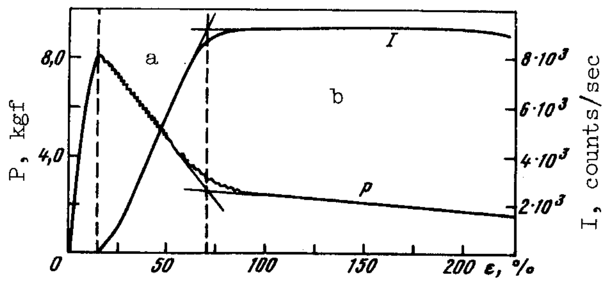
The nature of superplasticity (SP), an extremal state of a metal, is still not clear, in spite of the extensive use of the SP effect in practice. Information on the changes of the physical properties in superplasticity is therefore of interest.

We report here observation of electron emission at the instant of the transition of the alloy Pb + 43.5%Bi into the SP state. The tension was produced at a rate 1.85×10^{-3} sec^{-1} at room temperature in a vacuum of 10^{-5} Torr. To detect the electrons, we used a VEU-1A secondary-electron multiplier. The electron emission and the tension force were registered simultaneously for samples pre-deformed by compression (ε = 90%. The working part of the sample measured 20 ×3×3 mm.

The figure shows a plot of the electron emission intensity (I) on the degree of deformation (ε) and the elongation diagram. During the initial stage of the deformation (up to 15%), when strengthening of the sample takes place and the tension force P increases, no electron emission is observed. With further deformation, the load on the sample decreases (without formation of a neck in the sample, corresponding to the SP state) and reaches a steady-state value at an elongation 85 - 90%.

An emission current is registered at the instant when the SP sets in. Simultaneously with the lowering of the tension force on the sample, the emission intensity increases appreciably. Stabilization of the load corresponds to the maximum value of the emission current, which remains constant up to a 230% deformation.

The character of the stress-strain curve corresponds to a two- stage deformation process in the superplasticity regime. The first stage (a) may be connected with the recrystallization during the process of deformation [1], grain-boundary slip [2], or diffusion creep [3]. The second stage (b) is true superplasticity. The transition to this "quasiliquid " stage consists in accumulation of the strain energy in small regions of the lattice, and it is the spontaneous release of this energy which causes the metal to become weaker following the tension [4]. The stage of true superplasticity is characterized by a maximum value of the electron-emission intensity, which remains uchanged during the subsequent development of the process.



Change of electron emission intensity and of tensile force in superplastic deformation

In plastic deformation, there exist regions whose local temperatures differ from the mean value [5]. It can be assumed that the fluctuations of the local temperatures stimulate electron emission in the SP process. The growth of the emission current is due to the increase of the summary area of the heated metal sections during the first stage of the deformation, which remains constant on going over into true superplasticity.

The character of the change of the electron-emission intensity is a reflection of the kinetics of the deformation process in the SP regime. It is therefore possible that the same processes are responsible for the deformation mechanisms in the SP regime and for the electron emission.

A detailed study of the emission process can thus yield new information on the superplastic state and contribute to an explanation of this phenomenon. In addition, the observed emission effect affords greater experimental possibilities of investigating the dynamics of the relaxation processes occurring in superplasticity.

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CROSS SECTION AND ANISOTROPY OF URANIUM-235

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We have investigated the intermediate structure in the fission cross section $\sigma_{\gamma f}$ at gamma-quantum energies 5 - 12 MeV and the anisotropy at values of the maximum energy $E_{\gamma max}$ from 6 to 15 MeV.

The experiments were performed inside the betatron chambers of the Leningrad Technological Institute. The target was a uranium layer 150 μg/cm² thick (90% U^{235}, 1.4% U^{234}, 8.6% U^{238}). In both cases, the fragments were registered with mica, using a standard processing and counting procedure.

In the study of the photofission yield, the target and the mica detector were oriented along the gamma-beam axis. The angular distribution of the fission fragments was obtained with a sector chamber of 34.4 mm radius, in the center of which a target of 3 mm diam was placed at a 45° angle to the gamma-beam axis.

The photofission yield, in relative units, is shown in Fig. 1. The statistical measurement