CONFERENCE ON SURFACE PHENOMENA IN MELTS
AND IN POWDER METALLURGICAL PROCESSES

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A conference on surface phenomena in melts and in powder metallurgical processes, organized by the Institute of Metalloceramics and Special Alloys, Academy of Sciences, UkSSR in collaboration with the Inter-Institute Committee on Surface Phenomena in Melts attached to OKhN, AN, USSR, was held from May 17 to 22, 1962 in Kiev.

More than 200 people from 23 towns in the Soviet Union representing 65 research organizations, higher academic institutes and concerns, took part in the conference.

It dealt with questions on the theory of surface phenomena, methods of investigating surface tension, wetting, experimental results of studies in surface phenomena in metallic, silicate and salt melts, on interphase boundaries of metals-slags and metals-salts. The effect of surface active agents on the destruction of materials and other questions connected with surface behavior in solid bodies were also considered. Also covered were problems of applying the science of surface phenomena to technological processes of ferrous and nonferrous metallurgy, metalloceramics production, welding, soldering, etc.


Questions on the theory of commonly used methods of measuring surface tension of alloys were covered on papers by P. P. Pugachevich, "Elementary theory of calculations for improved gas apparatus for measuring surface tension," Yu. N. Ivashchenko, R. V. Bogatyrenko and V. N. Eremenko: "Modern state of the method of forming droplets for measuring the surface tension and density of metallic alloys." Several other papers also contained interesting methodical developments.

A group of papers was concerned with the surface phenomena on the boundary of metals and slags and their role in metallurgical processes and in welding operations (papers by A. V. Vanyukova and V. Ya. Zaiteva; Yu. P. Nikitina, O. A. Estina and S. I. Popelya; O. S. Bobkova and V. S. Petrykova, S. B. Yakobashvili, I. I. Frumina; and Yu. Nikitina).

Other interesting papers were by G. M. Bartenev and I. V. Pazymovska "The influence of surface-active agents on the kinetics of the destruction of solid bodies," N. V. Pertsov, Yu. V. Goryunov, A. P. Dekartov, B. D. Summ, F. D. Shchukin, "The formation of microscopic cracks in zinc in the presence of small amounts of surface-active metallic alloy;" Ya. E. Geguzina and N. N. Ovcharenko, "Thermal etching of double boundaries in connection with the aniso-
tropic coefficient of surface energy" and "Self-diffusion processes on the surface of polycrystalline gold at high temperatures," Ya. E. Geguzina and V. V. Karyakina; "Anisotropic volatilization of ionic crystals."

Various aspects of surface phenomena in solid bodies were covered in papers by B. S. Bokshtein, D. K. Belashchenko and A. A. Zhukhovitskii; N. L. Pokrovskii, T. G. Smirnova and V. V. Chirkova; and "Surface solid phase reactions between refractory materials" was the title of a paper read by G. V. Sarnonov, G. A. Yasinskaya, L. V. Strashinskaya, E. A. Shiller and A. L. Burykina; A. P. Epil read a paper on "The surface carbonization of molybdenum."

Papers by L. K. Savitska and P. A. Savintsev; I. G. Berzina and P. A. Savintsev; I. G. Berzina, L. K. Savitska and P. A. Savintsev were concerned with the role of surface phenomena and a number of other factors during melting. In the discussion on these papers, observations were made on the need to obtain more results on the theory and study of contact melting.

The investigation of the formation, structure and properties of alloy contacts of semiconductors with metals was discussed in a paper by V. A. Pressnov, A. P. Vyatkina and M. P. Yakuben.

A number of papers discussed surface phenomena in slags, silicates, oxide and salt melts. Of interest were papers by A. A. Appen and S. S. Kayalova, "Some general data on surface tension of silicate melts;" V. G. Korpacev, O. A. Esin and S. I. Popel', "The structure of the surface layer of oxide melts;" etc.

The interest of technologists was aroused by a paper from G. I. Belyaev, N. F. Smakota and Yu. D. Barinov, entitled "The reaction of borosilicate melts with some metals."

A group of papers dealt with the processing of wetting, impregnating, sintering in the presence of a liquid phase, etc.

Of interest was a paper by L. M. Shecherbakov and P. P. Ryazantsev, "The theory of wetting." Also papers by Yu. V. Naidich and G. A. Kolesnikhenko, "Study of the regularity of wetting of diamond and graphite by liquid metals and alloys;" V. A. Pressnov, M. A. Pushashov, M. P. Yakuben, V. V. Stroganova, A. M. Ivleva "The physicochemical nature of the formation of the bond between different substances."

The role of surface phenomena in the processes of sintering in the presence of a liquid phase was dealt with in a paper by V. N. Eremenko, Yu. V. Naidich and I. A. Lavrinenko, and also in a paper by I. P. Kislyakov.

Of problematical interest was a paper by E. G. Konovalov and I. N. Germanovich, "The influence of high frequency (ultrasonic) vibration on the passage of liquid media through capillary channels." However, the material presented was inadequate to make clear the stated effect.

Many conference members took part in the discussions.

In the resolutions made by the conference it was observed that in the time since the combined session of the Inter-Institute Seminar on questions of heat-resistance with the IMSS, AN, UkSSR and the Inter-Institute Committee on Surface Phenomena in Melts (OKLN, AN USSR) was held in Kiyev (Sept. 28th to Oct. 1st, 1959) there had been an increase in the scientific-theoretical level and practical direction of studies carried out in the Soviet Union on the surface phenomena in metallic and nonmetallic melts and also on the various interphase boundaries.

The resolutions observed that the absence of coordination of scientific-research on surface phenomena is leading to inadequate use of obtained data in the metallurgy of ferrous and nonferrous metals, in powder metallurgy and other regions and this is holding up technical process. It is recognized that it is necessary to create a scientific council on "Surface Phenomena in Melts and Phases Developed From Them."

The need was emphasized for developing methods of determining the surface energy of solid phases, the development of the investigation of surface properties of semiconducting and refractory compounds and alloys, the development of photoelectric studies of melt surfaces and the study of adsorption and the structure of surface layers.

The papers read at the conference are to be published as a book.