

## NEW-GENERATION THERMOTECHNICAL STEELS FOR POWER-PLANT MACHINE BUILDING

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The year 2009 was marked by three international conferences devoted to new-generation thermotechnical steels for power machine building, namely, the 2nd ECCC (“Creep and Fracture in High Temperature Components, April 21–23, Zürich, Switzerland), the 15th ICSAM (“Strength of Materials Conference,” August 16–21, Dresden, Germany), and the 6th “Thermec’2009” (August 25–19, Berlin, Germany).

The conference “**Creep and Fracture in High Temperature Components**” is conducted once every three years. In 2009 it was attended by about 200 scientists of the European Community, USA, Japan, China, Taiwan, South Korea, and India. One of five Russian-speaking scientists represented the Russian Federation. A total of 124 reports was presented of which 119 were issued in the Proceedings. Most of the works were devoted to the development of new-generation steels of martensitic and austenitic classes for coal-fired plants, optimization of the welding processes for these materials, and estimation of the retained life of power equipment. The possibilities of the use of the new steels in fast neutron reactors of generation IV were discussed. The works on thermotechnical steels of the bainitic class were primarily devoted to prediction of their retained life. The most interesting presentations were the report of Professor J. Hald from the Danish Engineering University on the prospects of high-temperature applications of steels bearing 11% Cr and some reports devoted to correction of permissible stresses for steels of type P91/P911/P92 according to the results of long-term tests performed by scientists from Japan, Great Britain, and Germany. Some of the materials from these reports are generalized in this issue of this journal in the form of a review “Formation of the Z-Phase and Prospects of Martensitic Steels with 11% Cr for Operation above 590°C.”

The “**Strength of Materials Conference**” is conducted once every three years. The conference was attended by about 350 scientists from 36 countries. The number of reports was 346. New-generation thermotechnical steels were considered within the “Section for High-Temperature Deformation and Creep.” The most interesting report was delivered by Dr. Fujio Abe from the National Institute for Mate-

rials Science (Tsukuba, Japan), in which he generalized the results of the work of his group on martensitic steels containing 3% Co for new-generation coal-fired power units designed for steam temperature of 650°C and pressure of 290 MPa. The research and development stage of the work has ended and commercial production has started. In 2014 Japan plans to convert a coal-fired power generating unit with these steam parameters, which will employ the steels described.

The International Committee has decided to conduct the next Conference in Bangalore, India. To meet the principle of rotation the Committee Member Ruslan Valiev (UGATU, UFA, the Russian Federation) left his position after the end of his term. The new member elected to represent the Russian Federation is Aleksey Romanov (Ioffe FTI, St. Petersburg).

**Thermec** is the largest international conference in the field of materials science. The conference of 2009 was attended by 1100 scientists from 43 countries. The number of reports was 1050. The results of the reports have been generalized in 786 papers in the “Materials Science Forum” and “Advanced Materials Research” Journals. As usual the largest delegation arrived from Japan (400 researchers). Russia was represented by 15 participants. Starting from 2009 the Conference will be conducted once every two years (after being conducted once every three years). Rustam Kaibyshev (BelGU, Belgorod) will represent Russia at the International Consultative and Executive Committee and Andrey Belyakov will represent the country at the Scientific Board of the Conference.

Works devoted to thermotechnical steels of the new generation have been considered at the section “Thermotechnical Steels and Refractory Alloys” (32 reports) and “Grain Boundaries” (8 reports). Some reports have been presented at the “Steels,” “Mechanical Behavior and Fracture,” and “Joining and Welding” Sections. Special interest was focused on the works of Japanese scientists devoted to structural changes in the new-generation thermotechnical steels of the martensitic and austenitic classes in the process of creep.

The present issue of this journal will be devoted to some works of Russian scientists generalizing the materials of the reports presented at the Conferences mentioned.

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