

Foreword

The Seminar of the Asian-Pacific Academy of Materials (APAM) “Materials and processes for the development of power electronic devices” was held on May 5–7, 2001 in Moscow. The Seminar was attended by the representatives of all the scientific schools and industry of Russia working in the area of developing the materials, devices and systems of power electronics, as well as specialists from Japan, China, Korea, Denmark, Taiwan, Byelarus, Ukraine.

Substantial interest expressed to the APAM Seminar in Moscow is explained first of all by the importance of the problems considered at the Seminar. Limited resources for the increase of electric power production in the 21th century and ecological problems will not give a possibility to provide high (or even moderate) life standards for the population. Mankind has recognized within the recent decades that this problem cannot be solved without introducing energy- and resource-saving technologies.

The intellectual power electronics is the grounds for modern energy- and resource-saving technologies providing prerequisites for the sustainable development of economy in general.

A real potential possibility to use power electronic devices is provided by the fact that only less than 25 % of electric power generated in the world at present is used efficiently with the help of energy devices transforming the

energy of the industrial circuits into the energy controlling the objects.

The potential of energy saving is especially high in Russia where the specific energy consumption for the manufacture of a unit gross national product is 3.5 times larger than the modern mean value in the world. The reasons of this may include cold climate, vast territories and the related transportation expenses, substantial fraction of extractive branches in industry. However, the major reason of high energy consumption is irrational consumption of energy resources. The scales of the use of modern energy-saving technologies based on the application of the novel power electronic systems in Russia are much less than those in the economically developed countries and in the majority of developing countries.

The trends of the development of economy and power engineering at any level from the global to regional, the status and trends of all the aspects of the development of power electronics, from materials and devices to the newest systems and technologies, have been the subject of reports, considerations and discussions at the Seminar.

The reports on the three major sections of the complex problem of the development of power electronics – materials, devices and systems – are presented to the reader in the specialized issue of the Journal.

*Professor Fedor A. Kuznetsov,
President of APAM*