European Networks Focus on Advanced Materials

The European Networks on Advanced Materials were established in 1987 to enhance scientific and technical cooperation between research teams from different countries. With the assistance of industrial and public institutions and with the support of the Council of Europe and the Commission of the European Communities, the European Materials Research Society is continuing to develop these networks. Eleven networks have established programs, and three are in the initial stages of development (see Table).

This article is part of a continuing series that focuses on the philosophies, aims and activities of the separate networks as described by their chairmen. Featured this month is Network 6 on High Energy Implantation.

A brochure detailing all the networks is available from: P. Siffert, Chairman, European Materials Research Society, Centre de Recherches Nucléaires, 23, rue de Loess, F-67037, Strasbourg, France; telephone 88 28 65 43; fax 88 28 09 90.

Network 6—High Energy Ion Implantation

Chairman: G.G. Bentini, CNR-Istituto LAMEL, Bologna, Italy.

The network on ion beam processing in materials for electronics involves the contribution of a number of European laboratories which, in the past years, have been among the most active centers in ion implantation in semiconductors.

In the recent past, ion beam processes have played an increasing role in the semiconductor industry and, from the early applications to the threshold adjustment of MOS devices, there has been an evolution toward the present situation in which ion implantation has become a well-established industrial technique. For many processes, the current trend is to substitute the traditional thermal diffusion steps with ion implantation, thanks to its capability for self-alignment with the mask and the possible reduction of the "thermal budget" in device manufacture.

The primary technological importance of such processes has already been explicitly established in the European Economic Community Workshop for "semiconductor manufacturing and testing equipment," held in Brussels, February 19, 1986, where, in particular, the proposal for the development of advanced high-energy implantation equipment was recommended for the second phase of the ESPRIT program. For the above reasons, this European network on ion beam processing in materials for electronics has been formed with the aim of developing a research program, based on the requirements of the microelectronics industry and concerned with the strategic field of high-energy implantation.

The need for a European network in this field is a result of the wide number of interdisciplinary activities necessary to develop the program. Also, the high-energy (high-current) implantation machines, now considered crucial for the development of microelectronics, are not available in any European country. Some machines suitable for such research will soon be operational outside Europe (in the United States), but they are "classified" and will not be sold during the next few years to European industries or research centers. In Europe, there are some designs of similarly advanced machines, and in one European industry (High Voltage Engineering, Holland) a prototype is under construction. Unfortunately, the cost of a high-energy implantation machine for applied research renders inadequate the budget of any one of the participating institutes if considered separately.

For this reason the network includes a proposal for the development of high energy-high current European implantation facilities where the necessary sample irradiation could be performed. Moreover, it is also recommended that the development of prototypes of the European high-energy implanters be supported.

It should be stressed that with the proposal for the development of a European implantation machine, the goal of this network is not limited only to cooperative research work on advanced processes, but also extends to the creation and use, on a European scale, of high-technology equipment having both scientific and commercial value.

Laboratories participating in this network are as follows: Max Planck Institut für Kernphysik; Hahn-Meitner Institut für Kernforschung; University of Aarhus; Trinity College Dublin; Centre National d'Etudes de Télécommunications; Centre de Recherches Nucléaires Laboratoire PHASE; CNR-Istituto LAMEL; Dipartimento di Fisica, Universita di Padova; Dipartimento di Fisica, Universita di Catania; FOM Institut voor Atom-en and Molecular Phys.; University of Surrey; and Atomic Energy Research Establishment, Harwell.

E-MRS Networks on Advanced Materials

Network Number	Theme	Group Leaders
1	Laser chemistry	K.L. Kompa, E.F. Krimmel (FRG)
2	Solid state ionics	M. Balkanski (France)
3	Modeling of solidification	H. Fredriksson (Sweden)
4	Metastable alloy production	J. Bottiger, B. Stritzker, M. von Allmen (Denmark, FRG, Switzerland)
5	Microanalysis of semiconductors	E. Sirtl, A. Cullis (FRG, UK)
6	High energy ion implantation	G.G. Bentini (Italy)
7	II-VI Te-based semiconductors	R. Triboulet (France)
8	Biomaterials	D. Muster (France)
9	Gallium arsenide	H.S. Rupprecht, W. Wettling (FRG)
10	Metal matrix composites	G. Chadwick (UK)
11	Electroactive polymers	M. Zerbi (Italy)

Emerging Networks: Superconducting ceramics, Materials under microgravity, InP and related III-IV materials.

Upcoming:

Review of the 1989 E-MRS Spring Meeting

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