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 are Network 7 on II-VI Telluride-Based Semiconductors and Network 8 on Biomaterials.

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 7—II-VI Telluride-Based Semiconductors

Chairman: R. Triboulet, CNRS, Bellevue, Meudon-Paris, France.

Infrared detection, used in numerous systems (IR imaging with IR cameras and medical tomography, fire detection, weather forecasting, gas detection in industry and environment, water pollution detection, etc.) from visible to far infrared, is widely covered by II-VI ternary tellurides. All these applications are related to the 3-5 μm and 8-12 μm wavelength ranges. Another emerging field is emission and detection for optical fiber telecommunications at longer wavelengths (1.3-1.5 μm and perhaps 2-5 μm with the development of new fluorinated glass fibers). Aside from the above applications, blue emission with ZnSe, ZnS, and perhaps infrared emission are foreseeable in the long term. New advanced heterostructures (their realization now possible because of advanced methods of epitaxial layer growth), and new (more stable) materials open a new era for this class of semiconductors and bring about new challenges for the scientific community. A collective effort from European laboratories seeks to lead to a breakthrough in these fields of great international competition.

Laboratories participating in this network include: Laboratoire de Physique des Solides, CNRS, France; Laboratoire PHASE, CRN, France; Laboratoire de Physique des Solides, INSA, France; Lauipe CNRS-CLING, France; Fraunhofer-Institut für Angewandie Festköperphysik, W. Germany; Universitat Zu Köln, Physikolisches Institut, W. Germany; Universita di Roma, Dipt. di Fisico, Italy; Universita di Bari, Dipt. di Fisico, Italy; Universita di Lecce, Dipt. di Fisica, Italy; Universidad de Lisboa, Centro de Fisico Nuclear, Portugal; Universidad Politecnico de Madrid, LISI de Telecomunicacio, Spain; Universidad Autonoma de Madrid, Spain; University of Southampton, Engineering Materials Labs, U.K.; University of Durham, School of Engineering and Applied Sciences, U.K.; and Universite de Liege, Institut de Physique, Belgium.

Network 8—Biomaterials

Chairman: D. Muster, LEED Biomateriaux, CHRU, Strasbourg, France.

Biomaterials, the "rebuilding materials" of the human body, play an important part in the restitution and preservation of the physical, psychological and social well-being of the individual. In the larger European countries approximately 50,000 total hip prostheses, 5,000 knee prostheses, 15,000 cardiac valves, 15,000 vascular prostheses, 20,000 cardiac pacemakers, 10,000 ophthalmic implants, and 2,000 dental implants will be fitted in each country per year. It is difficult to find realistic figures for the anticipated growth in the use of implanted devices, but they range from 5% per year for all orthopaedic implants to 15% for biomaterials overall. The 1995 estimated biomaterials market is about 6,000 millions ECU worldwide, with 3,129 million ECU for the United States alone (L. Hench et al., MRS Symposium Proceedings, Vol. 55, (1986, p. 66).

It is important to assert the European position in this field vis-a-vis the United States and Japan. During the last two years, the contacts established and the actions undertaken by the Biomaterials Group of the Council of Europe have resulted in the creation of a fully operational European network of laboratories. This group has also prepared an assessment study on biomaterials research and industry in Europe for the C.E.C. Directorate General XII. The partners agreed on joint action with three aims: training, research and development. The following subjects were offered as particularly likely to complement one another and generate new ideas: development of new materials specifically designed for biological use (new steel or titanium alloys, composites, etc.); optimization of traditional materials (surface treatment, coatings, ion implantation); study of their biocompatibility; and monitoring of implants under biological stress (biotelemetry, etc.).

Scientific operations and research-industry transfers are expected to benefit from the constant evaluation of network units combining researchers and manufacturers with marketing and banking specialists. European Intensive Courses organized by the group will promote and develop specific teaching indispensable for progress. Additional regional activities have been initiated.

Laboratories participating in this network include those of: F. Burny (Belgium); G. Hastings, Stoke-on-Trent, U.K.; P. Tranquill-Leali, Rome, Italy; E. Dörre, Plochingen, W. Germany; J. Cordey, Davos, Switzerland; and M.A. Barbosa, Porto, Portugal. □

E-MRS Networks on Advanced Materials

Network Number	Theme	Group Leaders
1	Laser chemistry	I.W. Boyd (UK) 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.