

Current State of the Division of Molecular Electronics and Bioelectronics, and Outlook for the Future



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The year 2005 marks the 20th year since the Division of Molecular Electronics and Bioelectronics (M&BE Division), The Japan Society of Applied Physics was established. As 2005 is also the 100th anniversary of the World Year of Physics, the M&BE Division has shared this path for one fifth of this important century. The M&BE Division began with the contributions of Toyosaka Moriizumi, emeritus professor of the Tokyo Institute of Technology (2nd Secretary General), among others, under the leadership of the late Masakazu Okada (then professor of Hiroshima University), who acted as the first Secretary General. The exceptional insight of the original members is clear in that one of the policies from the outset was the view that the integration of not only the organics field and the electronics field, but of the biology field as well, was essential to the development of the M&BE Division.

The M&BE Division started off as a small organization with only about 100 members, but as of April 2005, it already had 850 members, and the membership continues to grow steadily. Looking at this trend, we can say with confidence that the M&BE Division will continue to grow, building on the momentum established over the past 20 years. The main goal of the M&BE Division's first phase was to interact with researchers conducting research in different fields, and to encourage participation in these fields by young researchers who are not constrained by conventional boundaries. Among the various themes covered at annual meeting, study meetings, and seminars, the greatest level of interest was focused on new organic film growth technologies (dry processes, wet processes, electrolytic polymerization processes, etc.); most notably, the structures of these films, and methods of evaluating their characteristics and properties. Discussions on such topics contributed significantly to enabling researchers in different research areas to transcend the boundaries of these fields.

During this time, considerable progress was made in numerous technologies, including ultra-high vacuum technologies, STM technologies, electron microscopes, LB, and self-assembly technologies and others, and a common awareness within these fields was gradually cultivated. When the M&BE Division was first established, the researchers often talked about their "fields of specialization," but as time went on, they began to look at the research from a perspective that was not limited by such specialized fields. In this backdrop, the M&BE Division gradually shifted into its second phase. The unique features of this second phase can be clearly seen in the trends of the past ten years. At this stage, based on the strengths of researchers who have cultivated their knowl-

edge through these interactions and the young researchers who have been trained in these fields, the activities of the M&BE Division become even more energetic, targeting the development of devices that are expected to form the foundations of the industrial world - devices such as organic EL (electroluminescence), organic transistors, organic solar cells, and LCD displays.

Of course, this trend is related to global trends in this field, such as the discovery of organic EL materials, of high-mobility organic materials and of new liquid crystals. We would like to point out, however, that during this time, the M&BE Division has been fostering the ability to absorb these new trends. This has been accomplished by actively calling on young people in their 20s and 30s to take up the positions of Division secretaries and full-time secretaries while planning and conducting research meetings and seminars as part of the Division's activities, and by constantly encouraging participation in this field from other new fields, without placing excessive emphasis on any single area of research. The M&BE Division has thus been growing steadily over the years, but now, even as it directs its energies toward fields such as biotechnology and nanotechnology, it is working to add bioelectronics and molecular electronics to the existing fields of organic electronics (e.g., organic EL, organic FET, and liquid crystals).

The goals of the M&BE Division as conceived 20 years ago are about to be achieved, with the support of research activities targeting new organic devices and the discovery of new materials that could not have even been imagined at that time. In the future, the M&BE Division hopes to continue its activities, contributing to the efforts of the Division members and members of JSAP, but in terms of these future developments, we feel that leadership in the M&BE Division's activities, which have been steadily increasing in scale, has become more important than ever before. Exchanges between different fields have been useful in creating new trends, but with this expansion, we are currently witnessing a phenomenon characterized by a divergence of individual themes within the M&BE Division. For example, the annual meetings, which were conducted using a single session when the M&BE Division was first established, can now only be effectively administered using a parallel session. These types of issues cannot be avoided, but there is no doubt that this field will be of central importance in the 21st century. Based on the conditions outlined here, the M&BE Division will continue to grow and develop as an appealing organization in the future, while bringing together the knowledge and wisdom of its member researchers.

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