Investigating R&D Committee on Advanced Nanomaterials, Organic Device Development, and Life Science Application for Supporting Sustainable Growth

Technical Committee on Dielectrics and Electrical Insulating Materials

1. Objective

Research on organic electronics such as research on the electronic and optical functions of nanomaterials and thin films and the development of devices and sensors using organic materials, has been making great progress. Research on flexible electronics, printed electronics, bioelectronics, etc. has also been very active. In the near future, innovative devices using organic materials will be developed. In addition, research related to organic devices could be applied to life sciences. Nanomaterials and nanostructure control technology are considered crucial for the development of organic devices and their applications in life sciences, and various kind of attempts and research and development are being made to this end. Thus, research on nanomaterials, organic device development and life science application that create a new society and support sustainable growth is required.

From these points of view, this investigating R&D committee has been established to investigate and examine the most advanced nanomaterials, nanostructure control technology, evaluation techniques, high-performance/high-function organic device development and life science application. The objective of this investigating R&D committee is to contribute to the sustainable growth of society based on the development of new electronic devices and electrical equipment and industries such as energy, environment, and biotechnology.

2. Background and internal and external research activities

Research on organic electronics and bioelectronics is very active and extremely important at the Japan Society of Applied Physics. Research in this field is also active internationally, and many international conferences are being held. Research on nanomaterials and nanostructure control, development of organic devices, and application to life science are also becoming active. Several committees related to organic electronics have been established and operated by the IEEJ. Specifically, the Investigating R&D Committee on Advanced Nanomaterials and Nanostructure Control for Innovative Organic Devices and Life Science was operated from July 2017 to June 2020. However, the research on new functions, high-performance devices and sensors, and life science application is extremely important for future development in industries such as energy, environment, and biotechnology, and will lead to the expansion of AI and IoT businesses creating a new society. The AI and IoT businesses are expanding and developing rapidly, and it is considered that the investigations by the committee have not been completed sufficiently. Nanomaterials and organic devices are attracting more and more attention in various fields, and research in this field related to electrical and electronic materials, e.g., dielectric and insulating materials and functional materials, is becoming extremely important. From this point of view, further research activities on nanomaterials and organic device development and life science application for supporting sustained growth are considered necessary in future.

3. Investigative matters

1) Advanced nanomaterials and nanostructure control technologies
2) Surface and interface properties and evaluation techniques for nanomaterials and devices
3) Electronic and optical functions of nanomaterials, organic thin films, and composite films
4) Organic device development and life science application

4. Expected effects

Research on advanced technologies such as nanomaterials, nanostructure control, nanointerface property evaluation, and device and sensor applications, will link nanomaterials, organic thin films, and composite films to the development of high-performance, high-function organic devices, and it is also possible to expand to life science. Moreover, it is expected to

develop new functions to nanomaterials and nanostructure control technology for organic thin and composite films. The development innovative electronic devices and electrical equipment, and expansion into industries such as energy, environment, and biotechnology, and life science application are highly expected. Therefore, it is believed that this committee will significantly contribute to the development of electrical and electronic materials and devices in Japan and overseas and the sustainable growth of society.

5. Term of investigation

October 2020 to September 2023

6. Committee members

Position	Name	Affiliation	Member/Non-member category of IEEJ
Chairperson	Keizo Kato	Niigata University	Member
Member	Takeshi Asami	Denka Co., Ltd.	Non-member
〃	Eiji Ito	Shinshu University	Member
〃	Tomio Iwasaki	Hitachi, Ltd.	Member
〃	Satoru Iwamori	Tokai University	Member
〃	Takashi Ota	Panasonic Corporation	Member
〃	Hitoshi Onuki	Tokyo University of Marine Science and Technology	Member
〃	Tetsushi Okamoto	Toshiba Mitsubishi-Electric Industrial Systems Corporation	Member
〃	Mitsuyoshi Onoda	University of Hyogo	Member
〃	Hirotake Kajii	Osaka University	Member
〃	Sachiko Jonai	Niigata University	Member
〃	Masafumi Takesue	Kao Corporation	Member
〃	Masayuki Chikamatsu	National Institute of Advanced Industrial Science and Technology	Member
〃	Tatsunosuke Matsui	Mie University	Member
〃	Takaaki Manaka	Tokyo Institute of Technology	Member
〃	Yasuhiro Miura	Hamamatsu University School of Medicine	Non-member
〃	Tatsuo Mori	Aichi Institute of Technology	Member
〃	Hiroshi Yamauchi	Tokyo Denki University	Member
〃	Rumiko Yamaguchi	Akita University	Member
〃	Hiroshi Yamamoto	Nihon University	Member
〃	Norimitsu Yoshida	Gifu University	Non-member
Secretary	Shin-ichiro Nakajima	Japan Aviation Electronics Industry, Ltd.	Member
〃	Yusuke Aoki	Mie University	Member
Assistant secretary	Akira Baba	Niigata University	Member

7. Activity schedule

Committee meetings (including laboratory tours and lectures): 4 times/year; Secretariat meetings: 2 times/year; Planning of technical meetings and others.

8. Reporting format

As this investigating R&D committee is planning to invite lecturers from other fields and co-sponsor technical meetings with other academic societies in order to investigate advanced technologies, it may be difficult to prepare the technical report by IEEJ alone. Therefore, the report will be presented at the technical meeting, the symposium of the Annual Meeting of IEEJ, or the topical session of the Annual Conference of Fundamentals and Materials Society. If possible, a technical report will also be prepared.