

# Electrical Insulation News in Asia

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**IEEJ**

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# PREFACE

Dr. M. Kosaki

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## Long Live EINA

I have recently seen my 61st birthday come round which has special meaning in the Chinese calendar of coming back to the name of the year one was born. 1999 is the year of earth & rabbit as 1939 was. Sixty years have past since I was born of which I spent more than thirty years deeply involved in the research and education of electrical insulation materials and technology. In retrospect the electrical engineering developed monstrously into electronics, communication engineering, computer science and technology during my career years.



Imagine an international conference thirty years ago. Announcements, registration, program brochure and hotel reservations for the conference were all done through postal mailings or telephone callings. They have all been replaced by the Internet home page system. If you are not familiarized with a computer approach, you will miss the conference. If you are, you can update your conference information by browsing on your PC panel. This is the outcome of the computer and communication technology, and we could hold 1998 International Symposium on Electrical Insulating Materials (ISEIM'98) in Toyohashi, Japan in September 1998.

I understand that although the electrical insulation plays seemingly very passive role of sustaining voltage, it performs the role of power or signal transportation just as current carrying conductors. Since electricity is the sole and unique source of energy in the electronic, communication and computerized world, it is satisfying to know electrical insulation is indispensable wherever electricity is working. Therefore, "Long live EINA!" Human beings depend more and more on electricity in the coming new century and millennium if we can successfully clear the Y2K hurdle originated from the lack of our imagination at the birth of computer age.

Even in the field of electrical insulating materials and technology the application of computer is the main concern. The fingerprinting of partial discharge is only possible by computers. The monitoring a performance of apparatus and the insulation diagnosis can be effectively carried out by computers. At the same time the reliability of versatile computers is guaranteed by the electronic insulation technology. The computer technology is changing the world in unpredictable pace. Whether it contributes to our prosperity and amenity heavily depends on the imagination and cleverness of human beings.

Dr. Masamitsu Kosaki  
(President, Gifu National College of Technology)

## Society Activity in Transition

After world war II, Japan has achieved miraculous economic progress. Especially, during this last ten years and over, we saw a remarkable growth in the Japanese economy, bringing it to a size comparable with that of Western countries and even dragging the world economy along with it. What laid the foundation for all these economic progress are the gigantic semiconductor industry and the information, electric and electronics industries including the computer industry which are basically supported by the highly reliable electric power system. However, for the past few years with the future of the Japanese economy becoming more unpredictable, the high level of economic growth has reached its end and the Japanese economic environment has become really tough. Moreover, the neighboring Southeast Asian countries have been gradually developing and are now competing with Japan in the areas of hardware industries as steel, raw materials, machine parts, and so on. Considering the advent of Japan's advanced info-tech society and its aging population together with various environmental problems such as global warming, as far as our country's industrial structure is concerned, a shift from the material-intensive type of industry to a knowledge-intensive type of industry is inevitable.



As for the electric power industry which serves as the cornerstone of all industries, while ensuring system reliability there is also the requirement to cut on cost at the same time that from the viewpoint of the planet earth being likened to spaceship, consideration towards the earth's environment has become a matter of topmost concern. This has already started a kind of new quickening, calling for structural reform in the industrial field and a change of direction of scientific societies' various committee activities and also of academic institutions' educational and research activities. These reforms take the deregulation in the electric power industry and the various reforms adopted by universities aimed at achieving Center of Excellence status. In both the industrial field and the academe, the idea of competition has been introduced for the purpose of revitalizing both industry and academe.

The Japan Institute of Electrical Engineering has five Societies A to E. The Technical Committee of Dielectrics and Electrical Engineering that publishes this newsletter belongs to Society A (Fundamentals and Material Society) which is composed of 8 technical committees, namely Research and Education, Electrical Discharges, Light Application and Visual Science, Instrumentation and Measurement, Dielectric and Insulation, Metal and Ceramics, Magnetics, and History of Electrical Engineering. In order to catch up with changes in these fields, four new technical committees designed to actively contribute to the Society's future were inaugurated. These are the Technical Committee on Electromagnetic Theory, Technical Committee on Plasma Science and Technology, Technical Committee on Electromagnetic Compatibility, Technical Committee on Pulsed Electromagnetic Energy. Of the four newly inaugurated committees three are closely related to Electrical Insulation and Discharges, namely Plasma Science, Electromagnetic Compatibility, and Pulsed Electromagnetic Energy. The respective chairmen of these committees will do us a favor of writing about their committee on this issue.

Dr. Masanori Hara (Professor, Kyushu University)  
(Vice-president of Fundamentals and Material Society, IEEJ)

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# MEMORIAL ADDRESS

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Prof. T. Mizutani

## Great Contributions of Late Prof. M. IEDA

It is very sad to report that Professor Masayuki Ieda suddenly passed away on March 3, 1999 by pneumonia at the age of 73. He was a great worldwide leader in the field of Electrical Insulation and he made great contributions to bridge between Japan and International world (Asia, Europe and America) and also between Material Sciences and Technologies.

His main research achievements were many pioneering works in the development of polymeric insulating materials and their applications to high voltage power apparatus and cables, especially in 275 kV and 500 kV crosslinked polyethylene power cables. As early as 1950, he realized the potential applications of synthetic polymers as new insulating materials for electric power apparatus and cables. He has authored more than 400 papers and about 15 books. Many students who received their training in Prof. Ieda's laboratory became researchers and leaders in Japanese industries or university professors. Prof. Ieda's scientific accomplishments earned him a worldwide reputation. He delivered the Whitehead Memorial Lecture at CEIDP in 1986 and received IEEE Lamme Medal in 1993. He received many other awards such as the Electric Power Award of IEE Japan in 1980, the Outstanding Contributions Award of IEE Japan in 1993 and the CIGRE Distinguished Member Award in 1995.

Prof. Ieda had served as Board Member of many international conferences (such as CEIDP, ICPADM, ICSD, ICDL, ISE, ISH and so on), chairing sessions and serving as a spokesman from Asia and Japan. He was General Chairman of the 3rd International Conference on Properties and Applications of Dielectric Materials (ICPADM) in 1991 in Tokyo. He was also the Japanese representative to CIGRE SC-15 (Materials for Electrotechnology) from 1985 to 1990.

He was Chairman of IEEJ Technical Committee of Electrical Insulating Materials from 1976 to 1983, Vice President of IEE Japan from 1985 to 1987 and President from 1991 to 1992. He was also Member of the Science Council of Japan from 1985 to 1994. He devoted himself to the development of electrical insulation technologies and electrical engineering and also to the development of Science and Technology in Japan..

Prof. Ieda was born on Oct. 8, 1925 in Tokyo, Japan. He received the Bachelor's Degree in Electrical Engineering in 1949 and the Ph. D in Engineering in 1964 from Nagoya University, where he joined the faculty as Research Associate, later becoming Associate Professor and Professor of Electrical Engineering. He spent two years, 1964-66, as a postdoctoral fellow at Cornell University with Prof. P. Debye (a Nobel prize winner). From 1986 to 1989 he was Dean of the School of Engineering, Nagoya University, and he retired from Nagoya University in 1989. He was Professor Emeritus at Nagoya and Professor at Aichi Institute of Technology since 1989

Prof. Ieda's Farewell party was held at Nagoya Garden Palace Hotel on May 7, 1999, and about 500 persons gathered there to remember and thank him. Professor Ieda will be remembered by the scientific and engineering community not only as an eminent scholar but also as a great leader.

Prof. Teruyoshi Mizutani  
(Nagoya University)



Late Prof. M. Ieda (1925-1999)

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# OUTLINE OF TECHNICAL COMMITTEES ON DEI AND RELATED TC IN IEEJ

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## Technical Committee on Dielectrics and Electrical Insulation (DEI)

Chairperson: Y. Ohki (Waseda University)  
 Secretaries: R. Takeuchi (Hitachi Corp.)  
                   T. Okamoto (Central Research Institute of Electric Power Industry)  
 Assistant Secretaries: H. Miyata (Fujikura Ltd.)  
                               Y. Tanaka (Musashi Institute of Technology)

This Technical Committee (TC-DEI) was set up in 1979 succeeding the Permanent Committee on Electrical Insulating Materials at the reorganization of IEEJ. The activities of the Committee are covering mainly solid and composite dielectric and insulating materials and technology.

The primary activity of TC-DEI is the annual Symposium of Electrical and Electronic Insulating Materials and Applications in Systems, formerly called Symposium on Electrical Insulating Materials. In 1997 the 29th Symposium was held at Central Electric Club in Osaka on Sept. 30 and Oct. 1. Sixty-eight papers were presented including the invited paper of Prof. E. Gockenbach of Universität Hannover, Germany. The 30th Symposium in 1998 was jointly held with IEEE DEIS, Chinese Electrotechnical Society and Korean IEE in the style of International Symposium (ISEIM-98) in Toyohashi from Sept. 28 to 30, 1998, and ended very successfully. The numbers of papers and participants of ISEIM-98 respectively exceeded 200 and 180, beyond our expectation. The 31st Symposium will be held at the TEPCO R & D Center in Yokohama on November 16 and 17, 1999. The next ISEIM will be held jointly with the 34th Symposium in 2002, although its details have not been determined.

The TC-DEI organizes the Seminar for Young Researchers of Dielectrics and Electrical Insulation every two years. Its 27th meeting will be held on November 19 and 20, 1999.

The TC-DEI currently runs seven Investigating Committees (IC) which organize Technical Meetings (105 papers in 1998) and one Cooperative Research Committee (CRC) which edits and publishes this EINA.

Table 1 Investigation Committees in TC-DEI

Research Subject	Chairperson
Interfacial Electronic Phenomena and Intellectual Properties of Organic Thin Films (3 years from Apr. 1997)	M. Iwamoto (Tokyo Institute of Technology)
Standardization of Space Charge Measurement in Dielectric/Insulating Materials (3 years from Apr. 1997)	T. Takada (Musashi Institute of Technology)
Structure and Functions of Molecular Ultrathin Films, Organic Thin Films and Interfaces (3 years from July 1997)	F. Kaneko (Niigata University)
Electrical Insulation News in Asia (EINA) (2 years from Apr. 1998)	H. Yamashita (Keio University)
Mechanism of Treeing Degradation and Influence of Polymer Morphology (3 years from Apr. 1998)	N. Shimizu (Meijo University)
Evaluation and Improvement Methods of Insulation Interfaces (3 years from Jan. 1999)	T. Tanaka (CRIEPI)
Insulation Reliability of Electronic Equipment (2 years from Apr. 1999)	T. Tsukui (Tokai University)
Insulation Lifetime of Dielectric Materials and Electrical Apparatus (3 years from Apr. 1999)	T. Ito (Musashi Institute of Technology)

## Technical Committee on Plasma Science and Technology (PST)

Chairperson : M. Katsurai ( University of Tokyo)  
Vice Chairperson : S. Ishii ( Tokyo Institute of Technology)  
Scientific Secretary : S. Ono ( Musashi Institute of Technology)  
H. Sugai ( Nagoya University)  
Scientific Assistant : K. Yasuoka ( Tokyo Institute of Technology)

The Technical Committee on Plasma Science and Technology (TC-PST) was founded in April 1999. This committee has the basis on the plasma researcher's society that has organized Plasma Research Symposia several times every year since about 30 years ago. The field of activity of this committee includes researches and investigations of various plasmas in terms of plasma physical parameters as density, temperature and ionization degree, and application fields as nuclear fusion, plasma processing, and plasma chemistry.

The major activity of this committee is to succeed to organize the Plasma Research Symposia. Since April 1999, three symposia were held; in June at Osaka University, in September at Waseda University in Tokyo and also in September at National Institute of Fusion Science in Toki City followed by a study tour to the Large Helical Device (LHD) for fusion research. Once or twice every two years, symposium will be held outside Japan as Korea and Taiwan in collaboration with their domestic societies related to plasma science and technology. At each symposium, about 20 to 30 presentations are made. Presentations by young researchers in bachelor course and master course are strongly encouraged and appreciated.

TC-PST currently runs one investigation committee, and, a few new will be set up in future.

Table 1. Investigation Committee in TC-PST

Research Subject	Chairperson
Plasma-based Ion Implantation ( 3 years from June 1999)	K. Yukimura (Doshisha University)

## Technical Committee on Electromagnetic Compatibility (EMC)

Chairperson : T. Takuma (Kyoto University)  
Secretaries : Z. Kawasaki (Osaka University)  
S. Yokoyama (Central Research Institute of Electric Power Industry)  
Assistant Secretary : K. Miyajima (Central Research Institute of Electric Power Industry)

This new Technical Committee (TC-EMC) started in April 1999 in the Fundamentals and Materials Society (A-Society), the Institute of Electrical Engineers of Japan (IEE, Japan). It followed the breaking-up of the former Technical Committee on Applied Physics of Electricity (APE) into four technical committees.

Our modern life today is full of electromagnetic fields due to naturally-originated sources like lightning as well as artificial ones in almost all kinds of frequency. These sources make complex electromagnetic environments which usually give necessary benefits to and sometimes on the other hand interfere with every aspect of our life. The EMC (electromagnetic compatibility) issues are increasing their importance more and more with the recent development of the electricity-dependent life.

The issues have already been actively studied, for example, by a Research Committee (EMCJ) in the Institute of Electronics, Information and Communication Engineers (IEICE), Japan. The establishment of the TC-EMC in the IEE, Japan is based on the increasing significance of the field together with the fact that both sources and influences in the EMC issues have a close relation with electrical engineers.

The TC-EMC deals with the following items as the scope of its investigation activities.

- a) Generating sources of electromagnetic interferences, related to high voltage, static electrification, high current, electrical discharge, power electronics devices, and so on.
- b) Actual situations of electromagnetic interferences
- c) Measuring techniques in EMC
- d) Countermeasures against electromagnetic interferences
- e) Domestic and foreign standards related with EMC

The TC-EMC plans to start two investigation committees in the fiscal year 1999 up to March 2000. One of them, Investigation Committee on Lightning Damages in the Highly Information-Oriented Society, was already approved to begin its activity in January 2000. The chairperson is Dr. S. Yokoyama in the Central Research Institute of Electric Power Industry. It intends to investigate various aspects concerning damages caused by lightning with the term of about two years until March 2002. The investigation items are to cover, for example, countermeasures in low-voltage networks for electronics and communication, related standards abroad, techniques for analyzing lightning damages, and cost estimations.

## Technical Committee on Pulsed Electromagnetic Energy (PEE)

Chairperson	Kiyoshi Yatsui (Nagaoka university of Technology)
Vice Chairperson	Shozo Ishii (Tokyo Institute of Technology)
Secretaries	Kazuhiko Horioka (Tokyo Institute of Technology)
Assistant Secretary	Weihua Jiang (Nagaoka university of Technology)

The Technical Committee on Pulsed Electromagnetic Energy (TC-PEE) has been set up just recently, on July, 1999, to offer the opportunities for the members of IEE of Japan in the fields of the R & D on pulsed power technology and associated applications.

It has been successfully available to achieve extremely high energy density state by the pulsed power technology, for a very short time duration, though. To study it from various points of views is very important not only from a physical aspect, but also from a lot of applications. Such an extreme state achieved is closely correlated with many applications because it involves extremely high temperature, high pressure, high electric field, high density, high magnetic field strength, and so on. In this technical committee, the main themes concerned are ① the development of pulsed power technology, ② the achievement of extremely high energy density by being transferred to many kinds of beams, and ③ the associated applications. Although there has been growing number of scientists in this particular fields of interests, there have been no systematic activities in Japan. The establishment of this technical committee will be very useful in various aspects not only from electrical engineering but also from other related engineering and technologies. Regularly, four Technical Committee meeting will be held per year.

As of 1999, there is one investigation committee in TC-PEE. The research subject is called as "Production and Control of Pulsed Extremely High Energy Density State". The chairperson, vice chairperson, secretary and assistant secretary are Kiyoshi Yatsui (Nagaoka University of Technology), Shozo Ishii (Tokyo Institute of Technology), Kazuhiko Horioka (Tokyo Institute of Technology), and Weihua Jiang (Nagaoka University of Technology), respectively. Regularly, there will be four meetings per year. In 2000, some other technical committees will be settled.

The main themes to be studied and discussed in the regular research meetings (Pulsed Power Technology: PPT) are written in the following: ① development of pulsed power technology (e.g., power supply, switches, insulation technology), ② energy transfer technology of pulsed power (e.g., electron beam, ion beam, neutral beam, laser beam, pinch discharge, plasma focus), ③ production, control, evaluation/diagnostics, theoretical and computer simulation of extremely high energy density state, ④ applications of extremely high energy density state (e.g., microwave, materials, environment, radiation source, particle acceleration, flier acceleration, strong electromagnetic wave, free electron laser, X-ray laser, excimer laser, ultrahigh pressure/density/temperature/magnetic field strength, inertial confinement fusion, luminescence/display, diagnostics), and ⑤ others.

The regular research meetings (PPT) are open to participate to everybody who are interested in the pulsed power technology and associated applications.

## Technical Committee on Electrical Discharge (ED)

Chairperson:	K. Hidaka (The University of Tokyo)
Secretaries:	M. Yumoto (Musashi Institute of Technology) M. Nagao (Toyohashi University of Technology)
Assistant Secretaries:	T. Nakano (National Defense Academy) M. Hanai (Toshiba Corporation)

The Technical Committee on Electrical Discharge (TC-ED) has been charged with offering the opportunities for the members of IEE of Japan in the research field of electrical discharge to present their achievements, and studying and reporting on current status and future challenges in electrical discharge engineering. It was established formally in 1980, but its root goes back to the start of Expert Committee on Electrical Discharge in 1954. In order to meet the objective, a few subcommittees are organized in the TC-ED every year to survey the up-to-date subject and their activities continue for three years normally.

In the past, the following subcommittees were active and published the Technical Research Reports on a relevant subject: Discharge Simulation Methods, Surface Discharges in Diverged Fields, V-t Characteristics in SF<sub>6</sub>, Conduction and Breakdown in Dielectric Liquids, Plasma Processing, Fundamental Processes in Non-LTE Plasma, Simulation in Non-LTE Plasma, Field Measurements in Electrical Discharges, Breakdown Mechanism and Characteristics of Gas Mixtures, Modeling of Long Sparks, Interaction between Sparks and Laser, Space Charge Effects on Electrical Breakdown in Insulating Liquids, Effects of Interface and Foreign Matters on Electrical Breakdown in Insulating Liquids, High Stress Phenomena in Cryogenic Liquids, Plasma Reactors, Plasma Display, Database on Gas Discharges, Beam and Swarm Data for Gas Discharges and Plasma; Plasma Chemistry, Electrical Breakdown in Vacuum, and so on. The total number of the past subcommittees is 36 and the published technical reports reach 29 at the end of 1997.

Now eleven subcommittees are running for a survey of the listed subjects. Each subcommittee consists of 20-30 members who are the specialists in the relevant research subject or are interested in it.

The TC-ED is supporting more than ten domestic research meetings on electrical discharges every year where almost 250 full papers are reported by professors, scientists and students from universities and institutes and engineers from industries.

In 1998, "Handbook of Electrical Discharge" was completely revised after an interval of twenty-five years through the active support of the TC-ED. This handbook has a special advantage of including two discs of CD-ROM in which full text of it, database on electrical discharge and useful simulation software are stored, together with two volumes of hardcopy of total 1000 pages. The publication project of the handbook won 1998 Group Writing Award of IEE Japan.

The international and domestic conferences and annual seminar for young researchers are also promoted by the TC-ED in cooperation with the Technical Committee on Dielectrics and Electrical Insulation, IEE of Japan, the Institute of Electrostatics of Japan and the Japan Research Group on Electrical Discharge which consists of about 400 members whose backgrounds covers a wide area of electrical properties of solids, liquids and gases.

Table 1 Investigation committees in TC-ED

Research Subject	Chairperson / Secretaries /Assistant Secretaries
Plasma Properties for Technique of Promising Prospective Plasma-Processing	M. Sugawara / M. Ouchi, S. Ono / A. Matsuoka
Charged Particle Generation and Emission in Vacuum and Related Technologies for Controlling Electrical Discharges	S. Kobayashi / Y. Saito, M. Yumoto / Y. Suetsugu
Conduction and Breakdown Characteristics in Dielectric Liquids and their Applications to Electric Power Apparatus	H. Okubo / K. Kojima, N. Hayakawa / S. Yamada
Discharge Plasma Applications for Environmental Protection	T. Oda / H. Itoh, K. Soma / K. Simizu
Modeling of Nonequilibrium Plasma and Related Plasma Etchings	T. Makabe / H. Kouno, S. Samukawa

Pulsed Power Discharges and their Applications	H. Akiyama / T. Sakukawa, Y. Nakazawa / J. Katsuki
Plasma Display Discharge and Emission	S. Mikoshiba / S. Hashiguchi, T. Yoshioka
Gas Insulation Technology for prospective future transmission and substation apparatus	M. Hara / T. Gouda, H. Fujii / N. Hayashi
Physical and Chemical Reaction of Electrons, Ions and Excited Particles in Discharge Plasma	H. Itoh / Y. Nakamura, Y. Saito / S. Suzuki
Ultra Long Discharge Characteristics	T. Shindo / S. Matsumoto, N. Takagi / M. Miki
Construction and Application of Database on Surface Discharge	M. Endo / M. Chiba, S. Matsumoto

## Technical Committee on High Voltage Engineering (HV)

Chairperson:	M. Ishii (The University of Tokyo)
Secretaries:	A. Inui (Toshiba Co.) I. Aono (Mitsubishi Electric Co.)
Assistant Secretary:	H. Motoyama (Central Research Institute of Electric Power Industry)

This technical committee (TC) belongs to Power & Energy (P&E) Society of the IEE of Japan. This committee supervises activity of investigation on technical subjects related to high voltage engineering. Six investigation committees listed in Table 1 are active in October 1999. The scope of this TC resembles, but is broader than, that of the CIGRE Study Committee 33 (Power System Insulation Coordination).

In January 1999, TC on High Voltage Engineering jointly organized 1st International Workshop on High Voltage Engineering (IWHV) with TC on Switchgear and Protection, which also belongs to P&E Society of IEEJ. The workshop was successfully held at University of Ryukyus in Naha on the Okinawa Island attended by 97 participants from 7 countries. Selected papers from this workshop will appear on January 2000 issue of Trans. of IEEJ, P&E Society, as a Special Issue on IWHV.

Based on this success, 2nd Workshop is planned during Nov. 1-2, 2000 at Tottori City in the week just before Asian Conference on Electrical Discharge in Kyoto. At this Workshop, cooperation with other technical committees is extended to include TC on Electrical Discharge, belonging to Fundamentals and Materials Society. Several ordinary technical meetings are jointly organized every year with these two TCs, Switchgear and Electrical Discharge.

TC on High Voltage Engineering meets four times a year, and a technical visit to the new HVDC station in Wakayama is planned in the fall of 1999. The members of the committee other than the chairpersons of the investigation committees are from universities (4), research institute (1), electric power utilities (4) and manufacturers (9).

Table 1 Investigation Committees in TC-HV

Research Subject	Chairperson
Insulation and Surge Characteristics of Equipments on Distribution Line	S. Yokoyama (CRIEPI)
Electric and Magnetic Phenomena Associated with Earthquakes	K. Horii (ex-Daido Institute of Technology)
Lightning Location Systems	M. Ishii (The University of Tokyo)
Status Quo in Insulation Coordination	S. Sasaki (CRIEPI)
Systematization of Techniques in Analysis of Lightning Surges in Electric Power Systems	A. Ametani (Doshisha University)
Insulator Contamination (Application and Evaluation of Insulators under Variety of Environments)	K. Takasu (CRIEPI)

## Technical Committee on Electrical Wire and Cables (EWC)

Chairperson	Y. Sekii (Chiba Institute of Technology)
Secretaries:	S. Maeda (Mitsubishi Cable Industries, Ltd.) I. Shigetoshi (Fujikura Ltd.)
Assistant Secretaries	K. Iwasaki (The Furukawa Electric Co., Ltd.)

Technical committee on electrical wire and cables (TC-EWC) is the committee organized in IEEJ Power and Energy Society, with the committee members from universities, power and communication utilities, the railway company and cable manufacturers. The committee supervises the investigation committees dealing with the subjects concerning electrical wire and cables. In the past, such investigation committees as the investigation committee on DC cables, the committee on PD (partial discharge) detection technology and the committee on accessories for power distribution cables, have been organized. Those investigation committees published such technical reports entitled as "PD Detection Technologies Applicable to Power Cable Lines" or "Design, Construction and Testing of Terminations and Joint for Power Distribution Cable Lines". Two investigation committees are currently running. Their names and chairpersons are shown in Table 1. In addition to organizing those investigation committees, the technical committee holds the technical meeting to promote R&D activities for engineers in this field and provide opportunities of presenting the results of their technical achievements. Three technical meetings are planned during the fiscal year in 1999. The TC-EWC usually meets 4 times a year. One of the meetings is held with a technical visit by the committee members to facilitate understanding the trends of advanced science and technology. This year the committee members visited a high-rising residence named Elza-Tower, which is located in the suburbs of metropolitan area and equipped with the most advanced facilities.

Table 1 Investigation Committees in TC-EWC

Research Subject	Chairperson
Investigation Committee on Technology of Wires and Associated Accessories for Overhead Transmission lines	T. Tanaka M. Okada
Investigation Committee on Computer Software and Its Application for Underground Cable Lines	

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# ACTIVITIES OF THE TECHNICAL COMMITTEE ON DEI IN IEEJ

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## Digest Reports of Investigation Committees in DEI

### Investigating Committee on Structure and Functions of Molecular Ultrathin Films, Organic Thin Films and Interfaces

Futao Kaneko (Niigata University)  
Yasuo Suzuki (Nagoya University)  
Keizo Kato (Niigata University)  
Kazunari Shinbo (Niigata University)

The committee was established in July 1997, with the term of three years. The investigation has focused attention mainly on the subjects below:

1. fabrication techniques and evaluations of the structure of molecular ultrathin films and organic thin films,
2. new functions of molecular thin films and their interfaces,
3. evaluations and control of optical and electrical properties at interfaces of thin films, and
4. interface structures between different materials and evaluations of the interaction.

There were twelve committee meetings up to Sep. 1999 and six meetings of them were held for visiting distinguished laboratories in Japan, that is, NIMC, IMS, Yamagata Univ., Shizuoka Univ., ETL and Nagoya Univ. Lectures were given by the researchers at the labs about evaluation of organic thin films using energy-filtering transmission electron microscopy or photoelectron spectroscopy, properties of polymer dielectrics, molecular and nanophotonics, scanning probe microscopes, electronic structure of metal /molecular thin film interface and so on. Furthermore, detailed discussions among the members of the committee were carried out for their researches. There have been further lectures by the member and non-member researchers.

The results of the investigation will be summarized at the end of the term in 2000 as a technical report mainly for evaluation techniques of structure and functions of molecular thin films, organic thin films and interfaces.

### Investigation Committee on Various Problems with High Reliability for Insulation of Electronic Equipment.

T.Tsukui (Tokai University)  
Y.Yamano (Chiba University)  
K.Shutoh (Science University of Tokyo)  
M.Nonogaki (Mitsubishi Electric Co. Ltd.)

Electronic equipment is becoming small in size, light in weight, and high in performance. The printed wiring boards for the equipment are designed in fine and high density with multi layer, which result in small distance and high electric field strength between the foil conductors on the board. The insulating failures may occur on the board under such conditions. Therefore, an insulating reliability comes up to an important problem for the design of electronic equipment and systems. However, the study on the insulating reliability for the printed wiring board has not been systematically carried out.

One of the reasons for this may be a low operating voltage in the electronic circuit. Furthermore, it

is impossible to evaluate the reliability of the board by long term testing, because the electronic products such as personal computer or portable telephone must be designed within short-range term by request of a market.

In the previous investigation committee with the insulation reliability of the printed wiring board, the round robin tests of the ionic migration were carried out by more than 10 members to establish the evaluation method for the reliability by the environmental aging test. However, the tests under various environmental conditions have not been carried out yet.

From these viewpoints, a new investigation committee has started in April 1999 with 27 members. The main subjects of the committee are as follows.

- (1) Survey on test methods for insulating failures due to the ionic migration.
- (2) Survey on the insulating reliability with multi-constructed printed board.
- (3) Survey on insulating strength between the conductors against surge of high voltage.

We have held 2 committee meetings and one study meeting since the start of this committee. Now, we are surveying on practical problems with the insulating reliability occurring in the product of electronics equipments or products. At the end of the committee, we will publish the technical report.

## Investigation Committee on Insulation Life of Dielectric Materials and Electrical Apparatus

T.Ito (Musashi Institute of Technology)  
M.Miyamoto (Fuji Electric Corporate Research and Development, Ltd)  
K.Uchida (Chubu Electric Power Co., Inc.)  
Y.Ehara (Musashi Institute of Technology)  
K.Segawa (Toshiba Corporation)

The committee was established in April, 1999 with the term of three years. The committee consisted of 30 members from universities, research institutes, electric power companies, power apparatus manufactures and user companies of electric power. The diagnosis of insulating performance in power apparatus is an important research area to estimate the life limitation of electric apparatus. There are unknown deterioration mechanism still to be investigated on the insulating material and electric apparatus. The following activities have been achieved by this committee;

- (1) Investigation on relation between the deterioration mechanism of insulation material such as partial discharge, treeing and other signals for the deterioration.
- (2) Investigation on the diagnosis for power apparatus and power cable prior to breakdown.
- (3) Investigation on the prediction of life limitation with rotating machine, Cable, transformer, capacitor and power system.

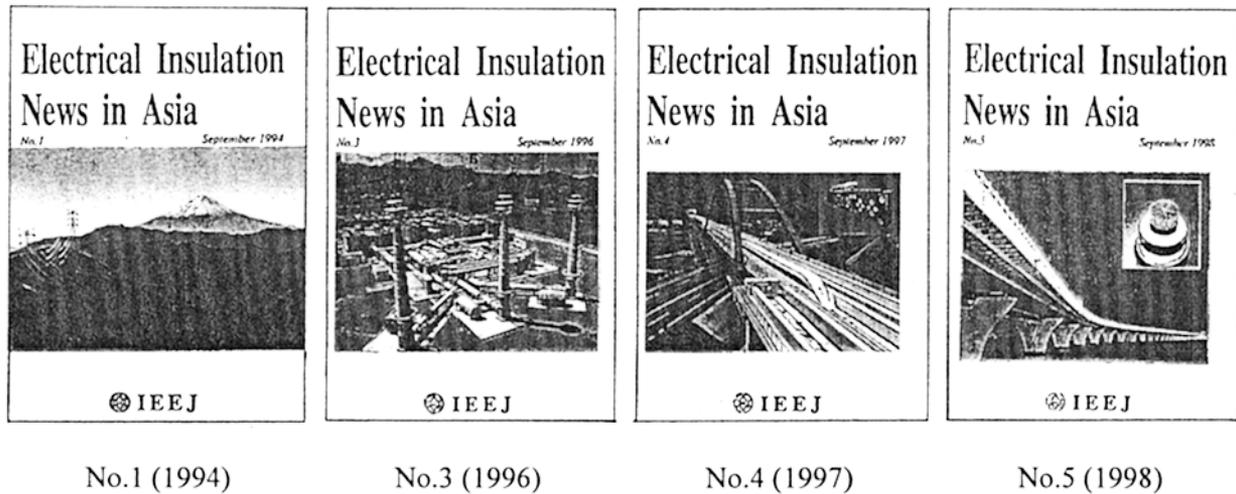
The committee has held 3 meetings. In 1999, the committee promote the Asian Conference on Electrical Insulation Diagnosis, and sent 17 papers from Japan. The committee will be promote the study meeting with life limitation and diagnosis of Dielectric Insulation Materials and Electrical Apparatus at Feb. 8, 2000 and Feb 2001.

## Cooperative Research Committee on Electrical Insulation News in Asia

Chairperson	H. Yamashita ( Keio University )
Secretary	T. Niwa ( Fujikura Ltd. )
Secretary	Y. Inoue ( Toshiba Corporation )
Assistant secretary	H. Miyata ( Fujikura Ltd. )

Preceding committee ("Cooperative Research Committee (CRC) on Asian Interlink on Dielectrics and Electrical Insulation", chairperson: late Prof. Ieda) worked from Jan. 1991 to Dec. 1992. The committee

reviewed the present status of scientific and technical cooperation in the field of dielectrics and electrical insulation among Japan and Asian countries and sought the appropriate ways to promote it. As an important activity discussed in the committee, the "CRC of Electrical Insulation News in Asia" was established in Apr. 1994 and edited and published "Electrical Insulation News in Asia (EINA)" No. 1 - 5 (in every September from 1994 to 1998), and will publish EINA No.6 in November, 1999. The EINAs have gained favorable responses by questionnaires inserted in distributed EINAs.



Front covers of some back numbers of EINA

## Investigation Committee on Mechanism of Treeing Degradation and Influence of Polymer Morphology

N.Shimizu (Nagoya University)  
H.Tanaka (The Furukawa Electric Co., Ltd.)  
M.Kanegami (CRIEPI)

Electrical energy is one of the most important infrastructures. XLPE cable, widely used in under-ground electric power transmission and distribution, plays very important role in stable electrical energy supply.

Lifetime of XLPE power cable is practically decided by treeing degradation, namely electrical and water treeing. The investigation of treeing phenomena is of importance concerning with reliability of electric power system. Much effort has been paid to investigate treeing phenomena, and fundamental process of initiation and propagation has been gradually clarified.

However a lot of the detailed points are still unclear. Especially the influence of polymer morphology such as spherulite, amorphous, free volume etc is left unclarified, although it is essential factor to treeing phenomena.

From this viewpoint, the committee was established in April 1998 with the term of three years. The main subjects of investigation and survey of this committee are

1. Initiation and propagation mechanisms of electrical tree and the influence of polymer morphology on them.
2. Initiation and propagation mechanisms of water tree and the influence of polymer morphology on them.
3. Initiation and propagation mechanisms of electrical tree originating from water tree and the influence of polymer morphology on them.

Since the start, we have held 9 regular meetings and 9 secretary meetings. The results of investigation and survey will be published in Technical Report of IEEJ.

## Papers Presented at the Technical Meetings of DEI

Titles of papers presented at the technical meetings of DEI are listed below which were held from September 1998 to September 1999.

### Theme: Electronic Equipment Insulation September 9, 1998, Tokyo Denki University

- DEI-98-44 Methods of Reliability Test for Ionic Migration in Printed Wiring Boards  
S. Yoda, S. Fujiki, T. Motoyama, H. Narusima, S. Yamada, T. Wada, M. Hanamori,  
M. Yamaguchi and K. Fujita, K. Hikasa
- DEI-98-45 An Interim Report On Joint Works of Migration Test  
H. Inoki, S. Yamamoto (TABAI ESPEC CORP.), K. Shutoh (Science Univ. of Tokyo),  
N. Yoshimura, K. Mitobe (Akita Univ.), H. Tanaka (Kusumoto, Chemicals, Ltd.), S. Fujiki  
(Toyama Industrial Technology Center),  
S. Takano and M. Osoegawa (Sumitomo Electric Industries, Ltd.)
- DEI-98-46 Investigation on Hazards of Home Electric Appliances  
K. Shuto and O. Sugawa (Science Univ. of Tokyo)
- DEI-98-47 The Subject of Reliability Evaluation for High Density Electronics Packaging  
T. Tsukui (Tokai University)
- DEI-98-48 Observation and Analysis of Deposits Generated by Ionic Migration  
T. Motoyama and K. Ichikawa (National Institute of Industrial Safety)
- DEI-98-49 Relation between Dielectric Characteristics at Low Frequency and Generation of Ionic  
Migration  
Y. Yamano (Chiba Univ.) and T. Tsukui (Toukai Univ.)
- DEI-98-50 Analysis of Discharge Current in Surface Dielectric Breakdown of Contaminated Printed  
Wiring Board under DC Magnetic Field  
Boxue Du and S. Kobayashi (Niigata College of Technology)
- DEI-98-51 Study of Copper Ionic Migration by means of Space Charge Measurement  
K. Okamoto (Fuji Electric Corp. R&D Ltd.), K. Fukunaga and T. Maeno (Communications  
Research Laboratory)

### Theme: Organic Ultra-thin Films, Organic Materials in general October 10, 1998, IEEJ Tokyo

- DEI-98-52 Nano-scale Control of Ultra-thin Organic Films by Automatic Dipping Machine with  
in-situ QCM  
S. Shiratori (Keio Univ.)
- DEI-98-53 Absorption and Attenuated Total Reflection Properties in Azobenzene LB Films  
Adsorbing Cyanine Dyes  
T. Fukami, F. Kaneko, K. Shinbo, K. Kato and S. Kobayashi (Niigata Univ.)
- DEI-98-54 Frequency Dependence of Conductivity of Carbon Black-Polyethylene Composites  
S. Nakamura, T. Tomimura and G. Sawa (Mie Univ.)
- DEI-98-55 Estimation of Electronic States in Polymers by Kelvin method -Effects of UV Irradiation  
and Heat Treatment-  
A. Kawamoto (Fukui National College of Tech.), Y. Suzuoki and T. Mizutani (Nagoya Univ.)
- DEI-98-56 Interfacial electrostatic phenomena and electric characteristics polyimide Langmuir-  
Blodgett films  
E. Itoh (Shinshu Univ.) and M. Iwamoto (Tokyo Institute of Technology)
- DEI-98-57 Doping Effects of Organic Ultrathin Films with Nanostructure  
M. Onoda (Himeji Institute of Technology)
- DEI-98-58 Operational mechanism of spectral sensitivity controllable cells using Organic dyes  
K. Shimada, M. Iizuka, S. Kuniyoshi, K. Kudo and K. Tanaka (Chiba Univ.)

- DEI-98-59 Electroluminescent Properties in Organic Light-emitting-diodes Using Oxazolidine Derivative  
H.Tsuge T.Mori and T.Mizutani(Nagoya Univ.)
- DEI-98-60 Preparation of an Inversely Stacked EL Device by Sputtering of ITO Electrode  
K.Tanaka,M.Kasahara and H.Usui(Tokyo Univ. Agricul. & Technol.)
- DEI-98-61 Improvement of Electrode-Organic Interface in Organic EL Device  
Y.Ohmori, Y.Kurosaka, T.Sawatani and K.Yoshino(Osaka Univ.)
- DEI-98-62 Characteristic Patters Observed in Freely Suspended Ferroelectric Liquid Crystal Films  
S.Uto(Osaka Institute of Technology) ,M.Ozaki and K.Yoshino (Osaka Univ.)
- DEI-98-63 Observation of Transient Diffraction Induced by Ionic Conduction in Nematic Liquid Crystal Cells  
K.Ochi and H.Naito(Osaka Prefecture Univ.)

Theme: Cable and Electric Equipment Insulation ,Space Charge and High Electric Field Phenomena  
November 17,1998, Fukuoka

- DEI-98-64 Study about Dissipation Current Waveform of Polymer Films in High-Field Region  
M.Fujii(Oshima National College of Maritime Technology), K.Tohyama (Numazu College of Technology), T.Tokoro(Gifu National College of Technology), Y.Muramoto, M.Nagao (Toyohashi Univ. of Technology) and M.Kosaki(Gifu National College of Technology)
- DEI-98-65 Characteristics of Short Time Space Charge Distribution up to Electrical Breakdown in Polymer  
K.Tanaka, S.Mitsumoto (Toyohashi Univ. of Technology), M.Fukuma (Matsue National College of Technology), M.Nagao (Toyohashi Univ. of Technology) and M. Kosaki(Gifu National College of Technology)
- DEI-98-66 DC Electrical Breakdown Characteristics and Space Charge Effect of Polar Polymer EVA film  
Y.Murakami (Matue National College of Technology),S.Mitsumoto (Toyohashi Univ. of Technology), M.Fukuma(Matsue National College of Technology), M.Nagao(Toyohashi Univ. of Technology)
- DEI-98-67 Effect of Cylindrical Function on Measurement of Space Charge Distribution in Coaxial Cable Insulator PEA Method  
K.Nagashima,Y.Tanaka,T.Takada(Musashi Institute of Technology) and Xiaokui Qin (Tongji Univ.)
- DEI-98-68 Diagnosis of Electrical Characteristics by Tap Tone Features on Generator Stator Coils  
S.Hagiwara, Y.Higashiyama, H.Kamiya and M.Onoda (Hitachi Ltd.)
- DEI-98-69 Electrification Property of Glass-fiber Reinforced Plastics by Applying DC Electric Field  
A.Fukuda,Y.Inoue,T.Inohara and M.Sakai (TOSHIBA Corporation)
- DEI-98-70 A Study on the influence of Space Charge on Electrical Breakdown  
T.Takeda,N.Hozumi, H.Suzuki, T.Okamoto(CRIEPI), K.Terashima, Kato(Electric Power Development Co.,Ltd.), T.Nakiri and T.Nakagawa (The Kansai Electric Power Company, Inc.)
- DEI-98-71 Study of the Morphology of Cross-linked Polyethylene  
H.Shintate,M.Yamaguchi,S.Wang and T.Shiono(Showa Electric Wire & Cable Co.,Ltd)
- DEI-98-72 Influence of Moisture Absorption Upon Internal Space Charge in Epoxy Resin  
T.Hosoya,H.Takai (Tokyo Denki Univ.), K.Fukunaga and T.Maeno (Communications Research Laboratory)
- DEI-98-73 A Statistical Investigation of Dielectric Breakdown of Low Density Polyethylene  
K.Asakawa, K.Mouri and Y.Sekii(Chiba Institute of Technology)
- DEI-98-74 The Effect of peroxide decomposition products and additives in XLPE Insulations on AC Tree Initiation  
K.Hirota, T.Okada, K.Maruta and Y.Sekii(Chiba Institute of Technology)
- DEI-98-75 Effects of Acetophenon on the Dielectric Property of Insulation Materials  
H.Miyata, T.Takahashi, I. Fujimoto and T. Niwa (Fujikura Ltd.)

- DEI-98-76 Degraded Detecting Performance of Insulation Diagnosis Using Low-Frequency Voltage  
H.Kamohara, Y.Kudo, I.Shinohara and A.Ito(Daiden Co.,Ltd.)
- DEI-98-77 Charge of glass substrate for LCD caused by contact with plates  
H.Kitabayashi,H.Fujii(Mitubishi Electric Corp.) and T.Ooishi (Advanced Display Inc.)
- DEI-98-78 Study of an Ultra High-resolution PEA Charge Measurement System  
T.Maeno and K.Fukunaga(Communications Research Laboratory)
- DEI-98-79 Measurement of Space Charge Distribution Using the Pulsed Electroacoustic Method in Water Treed Sheet Samples  
C.Takeya(Tatsuta Electric Wire and Cable Co.,Ltd.), Y.Tanaka(Musashi Institute of Technology) and Y.Ohki(Waseda Univ.)
- DEI-98-80 Study on the Applicability of New Insulating using Rapeseed Ester Oil for Transformer  
Y.Nakagami, K.Kawanishi, M.Miyamoto(Fuji Electric Corporate R&D Ltd.), R.Miya, H.Kobayashi,M. Kousaka and M.Wada(Fuji Electric co.,Ltd.)
- DEI-98-81 Harmonic AC Loss Current of 22kV XLPE Cables  
H.Okamura, T.Genji(The Kansai Electric Power Co.,Inc), S.Harada, T.Awaji, K.Hirotsu (Sumitomo Electric Industries, Ltd)
- DEI-98-82 Effect of Plasma Treatment on the Charge Distribution in Some Polymers  
F.Massines, G.Gouda (Univ. Paul Sabatier, France), T.Toyoda, Y.Ohki (Waseda Univ.), K.Fukunaga and T.Maeno(CRL)

Theme: Cable and Electric Equipment Insulation  
November 17, 1998, Fukuoka

- DEI-98-83 An Effect of DC Ore-stressing to AC Field Distortion in XLPE Cable  
T.Tanaka, T.Itaya(Tokyo Electric Power Co.,Inc.), S.Maruyama, H.Tanaka (The Furukawa Electric Co.,Ltd)
- DEI-98-84 The Investigation of The Diagnostics of Water-tree Degraded XLPE Cable By Residual Method  
T.Toda, M.Naruse(Chubu Electric Power Co.), H.Kon, M.Yoshida, K.Watanabe(Fujikura Ltd.)
- DEI-98-85 Development of new Halogen-free Flame-retardant Cables (1)  
T.Demura, Y.Ueda, K.Ashida and Y.Miyashita(Mitsubishi Cable Industries, Ltd.)
- DEI-98-86 Development of Inorganic Insulation used for Nb<sub>3</sub>Sn Superconducting Coils  
H.Hatano, F.Sawa, T.Wada,T.Shumonosono and H.Moriyama (Toshiba Corporation)
- DEI-98-87 Measuring Method of Potential Distribution Characteristics on Coil End Corona Shields of High Voltage Rotating Machines  
Y.Higashimura, Y.Kurahara and S.Hagihara(Hitachi,Ltd)

Theme: Space Charge and High Electric Field Phenomena  
November 18, 1998, Fukuoka

- DEI-98-88 Space Charge Distribution of Polyimide Films in High Temperature Region  
Y.Muramoto, S.Mitsumoto, M.Nagao (Toyohashi Univ.of Technology), M.Fukuma (Matsue National College of Technology) and M.Kosaki (Gifu National College of Technology)
- DEI-98-89 Internal Structure and ER Properties in ER Suspensions of Disperse System under DC Electric Field  
R.Hanaoka, K.Hotta (Kanazawa Institute of Technology),H.Anzai, K.Sakurai (Fujikura Kasei Co.,Ltd.) and S..Kuroda(Gunma Univ.)
- DEI-98-90 Mechanisms of heat degradation of polyethylene and crosslinked Polyethylene  
J.Ikehara, T.Ikeda, T.Ashida and M.Fujii(Mitsubishi Cable Industries)
- DEI-98-91 Various Characteristics of Interfacial Space Charge in Polyethylene Laminated Insulation Structure  
T.Tanaka (CRIEPI) and M.Uchiumi (Kyushu Univ.)
- DEI-98-92 Study on Partial Discharge Measuring Technique and Characteristics of Dry-type

Metallized Polypropylene Film Capacitor

Y.Makino, Z.Tian, M.Hikita (Kyushu Institute of Technology) and T.Hirota (Shizuki Electric Co., Inc.)

- DEI-98-93 Frequency Dependence of Conductivity and Permittivity of Water-tree Samples  
Y. Li, M. Ogishima, T. Sumimoto, J. Kawai and J. Shinagawa (Showa Electric Wire and Cable Co.,Ltd.)
- DEI-98-94 Polarity Effect of Charge Accumulation at LDPE/EVA Interface  
T. Ito, Y. Tanaka, T. Takada (Musashi Institute of Technology) and T. Tanaka (CRIEPI)
- DEI-98-95 Effect of Acetophenone on Space Charge Formation in PE  
K. Kobayashi, T. Ohara, Y. Ohki (Waseda Univ.) and T. Maeno (Communications Research Laboratory)

Theme: Functional Organic Films in general

November 20, 1998, Toyama

- DEI-98-96 Luminescence of Organic Films with Field Emitter Array  
Y.C.Luo, M. Kesyo, J. Isoda, S. Naka, M. Shibata H. Okada and H. Onnagawa (Toyama Univ.)
- DEI-98-97 Electrical Characteristics of compound structure of LB/Metal film  
K.Tafuchi, K. Sato, A.Kitagawa and M. Suzuki (Kanazawa Univ.)
- DEI-98-98 Self-assembly of organic-inorganic superlattice and nano-electric circuit by simultaneous deposition in vacuum  
K. Orihara, K. Hosono, Y. Yamagata, M. Kawamata and Y.Sato (Yamagata Univ.)
- DEI-98-99 Nano-scale Control of Layer-by Layer Absorbed Polyelectrolyte Films by Solution pH  
S. Shiratori (Keio Univ.) and M.F.Rubner (MIT)
- DEI-98-100 Observation of Construction and Structure of Fullerene Assembled by Liquid Phase Process  
S.Ogawa, T. Watanabe, H. Furusawa N. Yoshiyama and H. Yamamoto (Nihon Univ.)
- DEI-98-101 Synthesis of Poly(p-phenylene vinylene) Derivatives and Their Electronic and Optical Properties  
M. Onoda (Himeji institute of Technology)
- DEI-98-102 Temperature Dependence of Twist Elastic Constants in Fluorinated Liquid Crystals  
K. Ikeda, H. Okada, H. Onnagawa (Toyama Univ.) and S. Sugimori (Toyama National College of Technology)
- DEI-98-103 Characteristics of nematic liquid crystal cells with Langmuir-Blodgett monolayer  
K. Kato, A. Matsumura, Y.Majima and M.Iwamoto(Tokyo Institute of Technology)
- DEI-98-104 Evaluation of Liquid Crystal Molecules on Poly(vinyl-cinnamate) Aligning Layers using the Attenuated Total Reflection Measurement  
M.Isobe, S. Yamagata, A. Baba, F. Kaneko, K. Shinbo, K. Kato (Niigata Univ.) and T. Wakamatsu (Ibaraki National College of Technology)
- DEI-98-105 Direct Observation of Molecular Orientation States by Using a UV Curable Liquid Crystal  
S. Takahashi(Akita Univ.), S. Masuda(Advantest Laboratories, Ltd), S. Yanase(Akita Research Institute of Advanced Technology), T. Nose and S. Sato (Akita Univ.)

Theme: Electric/optic conversion and Application

January 28, 1999, Tokyo

- DEI-99-1 Two-dimensional Lock-in Amplifier System for Optical Measurements  
T. Maeno (Communications Research Laboratory)
- DEI-99-2 Electric Fields Measurement by Using Pockels Sensor  
T. Takahashi (CRIEPI)
- DEI-99-3 Potential Difference Probe Based on Pockels Sensing Technique  
K.Hidaka, A. Kumada, S. Sakatani, E. M. Gamborg and M. Chiba (The Univ. of Tokyo)
- DEI-99-4 High Sensitive Current Measurement using an Azimuth Angle Modulation Method  
T. Hirose, M. Yonemura, T. Takada and Y. Murooka (Musashi Institute of Technology)

- DEI-99-5 Dynamic Measurement of Electric Field at the Streamer Tip of Surface Discharge  
T. Ohba, T. Ikeda, T. Takada and Y. Murooka (Musashi Institute of Technology)
- DEI-99-6 Optical High Sensitive Measurement of Shearing Stress and Principal Stress in Photoelasticities  
T. Urabe, T. Koyama, T. Otsuka, T. Takada and Y. Murooka (Musashi Institute of Technology)

Theme: Special environmental Electrical Insulation

February 9, 1999, Waseda Univ. Tokyo

- DEI-99-8 Study of Ultraviolet Laser Induced Photoluminescence of Polypropylene Film  
T. Toyoda, Y. Ohki (Waseda Univ.), K. S. Seol (Riken, Waseda Univ.) F. Massines (Paul Sabatier Univ., Waseda Univ.), Ch. Laurent (Paul Sabatier Univ.)
- DEI-99-9 Feasibility Study of Ethylene-Propylene Rubber to Apply Cryogenic DC Electrical Insulation  
A. Minoda (Matsue National College of Technology), M. Nagao (Toyohashi Univ. of Technology), M. Kosaki (Gifu National College of Technology)
- DEI-99-10 Space Charge Distribution of Polyimide Films up to Breakdown in High Temperature Region  
Y. Muramoto, M. Nagao, S. Mitsumoto (Toyohashi Univ. of Technology), M. Fukuma (Matsue National College of Technology), M. Kosaki (Gifu National college of Technology)
- DEI-99-11 Radiation Resistance of Liquid Crystal Polymer  
A. Ogata, M. Nitta, T. Tani (Yazaki Electric Wire Co., Ltd), T. Yagi, Y. Morita (JAERI-Takasaki)
- DEI-99-12 Study of Radiation and Thermal Aging for Cable Insulation Materials by Photoacoustic Method  
Y. Morita (JAERI-Takasaki), J. Ikehara (Mitsubishi Electrical Cable Industry), T. Yagi (JAERI-Takasaki)
- DEI-99-13 Temperature Dependence of Radiation and Thermal Aging for Cable Insulation Materials  
J. Ikehara (Mitsubishi Electrical Cable Industry), Y. Morita and T. Yagi (JAERI-Takasaki)
- DEI-99-14 Effect of annealing on the charge trapping property of Ta<sub>2</sub>O<sub>5</sub>/Si<sub>3</sub>N<sub>4</sub>/p-Si capacitors  
H. Kato, Y. Ohki (Waseda Univ.) and Kwang Soo Seol (The Institute of Physical and Chemical Research, Waseda Univ.)
- DEI-99-15 Creeping Partial Discharge Properties of Ceramic Insulating Materials at High Temperature  
H. Sugimoto, M. Ishida (Univ. of Tsukuba)
- DEI-99-16 Dielectric Properties of Insulator under High Temperature  
Y. Mizutani, T. Ito, T. Okamoto (CRIEPI), R. Kumazawa, M. Nakazaki, R. Aizawa (Toshiba)
- DEI-99-17 Flashover Voltage Characteristics of Electrical Insulation Break for ITER/CS model Coil  
M. Sakai, A. Fukuda, T. Fujioka (Toshiba Corp), T. Isono, T. Kato (JAERI)
- DEI-99-18 High Radiation-resistant Image Fiber for Remote Maintenance Equipment of ITER -Characteristic of Irradiated Fiber under Hydrogen Gas flow-  
Y. Morita (JAERI-Takasaki), K. Obara (JAERI-Nara)
- DEI-99-19 Structural changes induced by ultraviolet photons in H<sub>2</sub>-loaded Ge-doped SiO<sub>2</sub>  
T. Kasahara, N. Miyazaki, S. Tokuhiko, T. Katoh and Y. Ohki (Waseda Univ.), M. Fujimaki (Waseda Univ., Research Fellow of the Japan Society for the Promotion of Science)
- DEI-99-20 Photo-induced refractive index change of Ge-doped SiO<sub>2</sub> during exposure to UV lasers  
Y. Miyake, H. Nishikawa, E. Watanabe and D. Ito (Tokyo Metropolitan Univ.)
- DEI-99-21 Formation Mechanism of Defects in Ion-Implanted Si-Thermal Oxides  
H. Yabuki, H. Nishikawa, E. Watanabe, D. Ito (Tokyo Metropolitan Univ.), M. Takiyama (Nittetsu Electronics)
- DEI-99-22 Low Temperature Crystallization of SrBi<sub>2</sub>Ta<sub>2</sub>O<sub>9</sub> Ferroelectric Film by Ultraviolet Laser Irradiation

H. Hramatsu, Y. Ohki (Waseda Univ.), K. S. Seol (Riken, Waseda Univ.), D.-S. Shin, I.-H. Choi (Korea Univ.)

Theme: Reports on International Conference and Interfacial Electric Phenomena  
February 22, 1999, Tokyo

- DEI-99-23 Report on the 6<sup>th</sup> Spacecraft Charging Technology Conference  
Y. Tanka (Musashi Institute of Technology)
- DEI-99-24 Report on the 1998 Conference on Electrical Insulation and Dielectric Phenomena(CEIDP)  
T. Takada (Musashi Institute of Technology)
- DEI-99-25 Report on 1998 IEEE 6<sup>th</sup> International Conference on Conduction and Breakdown in Solid Dielectrics  
Y. Ohki (Waseda Univ.)
- DEI-99-26 Report on 1998 CIGRE Paris Meeting: SC15 (Materials for Electrotechnology)  
T. Mizutani (Nagoya Univ.), K. Goto (Toshiba) and M. Nagao (Toyohashi Univ. of Technology)
- DEI-99-27 Report on the 5<sup>th</sup> International Conference on Dielectric and Related Phenomena (DRP'98)  
S. Fujita (Hachinohe Institute of Technology)
- DEI-99-28 Report on International Conference on Electric Charge in Solid Insulators  
K. Fukunaga (Communications Research Laboratory)
- DEI-99-29 Electroluminescence in XLPE due to Impulse Voltage –Report of NRC Research Worker Abroad-  
K. Tohyama (Numazu College of Technology), S. Bamji and A. Bulinski (National Research Council Canada)
- DEI-99-30 Characteristics of Accumulation and Decay of Space Charge in LDPE/EVA Laminated  
T. Ito, Y. Tanaka, T. Takada (Musashi Institute of Technology) and T. Tanaka (CRIEPI)
- DEI-99-31 Charge Oscillation at the Interface in the Multi-layer Insulation  
N. Hozumi, T. Takaeda, H. Suzuki and T. Okamoto(CRIEPI)
- DEI-99-32 Effects of Interfacial Phenomena on Dielectric Breakdown in Filled Epoxy Resin  
M. Ezoe (Nitto Denko Corporation), M. Nakanishi (Nitto Shinko Corporation) , M. Nagao and Jia ShouGuo(Toyohashi Univ. of Technology)
- DEI-99-33 Development of Model Specimen for Evaluating Electrical Insulation Properties of Polymeric Solid-Solid Internal Interface  
N. Ka, M. Nagao, M. Muramoto (Toyohashi Univ. of Technology) and T. Tanaka (CRIEPI)
- DEI-99-34 Tree Propagation at Insulating Polymer-Polymer Interface  
E. Kobayashi (Nagoya Univ.), F. Komori (Toba National College of Technology), Y. Suzuoki, T. Mizutani (Nagoya Univ.) and T. Nagata ( Chubu Electric Power Co. Inc.)
- DEI-99-35 Dependence of Low Molecular Weight Fluid on the Formulation of Silicone Rubber  
R. Hackam (Univ. of Windsor)
- DEI-99-36 Evaluation of Outdoor Polymer Insulating Materials by Salt-fog and Inclined-plane Methods  
S. Kumagai and N. Yoshimura (Akita Univ.)
- DEI-99-37 Hydrophobicity Recovery Phenomena of Artificially Polluted Silicone Rubber for Hollow Composite Insulator  
Y. Hirano, A. Kobayashi, H. Murase, T. Inohara and K. Goto (Toshiba Corp.)
- DEI-99-38 Evaluation of Surface Degradation of Silicone Rubber Using Gas Chromatography/Mass Spectroscopy  
H. Homma, T. Kuroyagi and K. Izumi (CRIEPI)
- DEI-99-39 Effect of Surface Tension of Liquid on the Evaluation of Hydrophobicity of Silicone Rubber Insulator  
T. Tokoro (Gifu National College of Technology)
- DEI-99-40 Surface Insulation Characteristics of Silicone Rubber under Wet and Contaminated

Conditions

M. Hiraoka, M. Nagata, M. Shimada, Y. Mizuno (Nagoya Institute of Technology), K. Naito (Meijo Univ.), M. Ishiwari, H. Shinokubo, Y. Koshino and K. Kondo (NGK Insulators, Ltd)

Theme: Cable and Electric Equipment Insulation and Space Charge

June 28, 1999, IEEJ Tokyo

- DEI-99-41 Improvement in Resolution of PEA Space Charge Measurement System  
T. Miyazaki, Y. Tanaka, T. Takada (Musashi Institute of Technology) and T. Maeno (Communications Research Laboratory)
- DEI-99-42 Space Charge Measurement and Signal Processing by LIPP Method  
S. Muto, Y. Tanaka, T. Takada (Musashi Institute of Technology) and T. Maeno (Communications Research Laboratory)
- DEI-99-43 Detection of Water Tree Position in Cable Insulation Wall by using PEA method  
K. Suzuki, Y. Tanaka, T. Takada (Musashi Institute of Technology), Y. Ohki (Waseda Univ.) and C. Takeya (Tatsuta Electric Wire and Cable Co., Ltd.)
- DEI-99-44 Some Points to be Considered in Space Charge Measurement  
Y. Ohki (Waseda Univ.)
- DEI-99-45 The Influence of Anti-oxidant on the Space Charge Profiles in LDPE and XLPE  
T. Nakui, K. Itabashi, M. Nomura, Y. Sekii (Chiba Institute of Technology) and T. Maeno (Communications Research Laboratory)
- DEI-99-46 A Study of the Method for Evaluating dc Performance of Dielectric Materials using Space Charge and dc Leakage Current Measurement  
T. Takeda (CRIEPI), N. Hozumi (Toyohashi Univ. of Technology), H. Suzuki and T. Okamoto (CRIEPI)
- DEI-99-47 Time Dependent Characteristics of Electric Field Strength Distribution in an EPR/XLPE Sheet  
S. Wang, S. Miyake, A. Kuwaki, T. Shiono (Showa Electric Wire & Cable Co. Ltd.), T. Nakagawa and T. Nakiri (The Kansai Electric Power Company Inc.)
- DEI-99-48 Space Charge Formation in Low-Density Polyethylene Prepared by Metallocene Catalyst  
H. Semi, K. Kaneko, T. Mori, T. Mizutani (Nagoya Univ.) and M. Ishioka (Japan Polychem Co.)
- DEI-99-49 Partial Discharge Properties of a Void in LDPE  
K. Kondo, K. Nakao and T. Mizutani (Nagoya Univ.)
- DEI-99-50 Study on Life Cycle Management Concerning Insulation Diagnosis  
N. Hozumi, M. Kanagami, T. Takahashi, T. Takeda and T. Okamoto (CRIEPI)
- DEI-99-51 Dynamism of Interconnected Channels and Loss Current in Water Treed Polyethylene  
J. Kawai, M. Ogishima, Y. Li, J. Shinagawa, Y. Ebinuma (Showa Electric Wire & Cable Co., Ltd.), S. Nakamura and G. Sawa (Mie Univ.)
- DEI-99-52 Relationship between Electroluminescence and Aging in insulating Materials  
T. Itou, T. Nakiri (The Kansai Electric Power Co., Inc.), F. Zong-huai, T. Takahashi, J. Suzuki and H. Miyata (Fujikura Ltd.)

Theme: Treeing, Partial Discharge, Other Insulators in general

July 22, 23, 1999, Akita University

- DEI-99-53 Study on Some Physical Chemical and Electrical Properties of Sol-gel SiO<sub>2</sub> Thin Film – Water Impurity and its Electrical Effects  
Z. Shoubin and N. Yoshimura (Akita Univ.)
- DEI-99-54 Effects of Dust, UV radiation and ATH Filler Level on Leakage Current on Silicone Rubbers  
T. Kodama, S. Kumagai and N. Yoshimura (Akita Univ.)
- DEI-99-55 Dielectric Relaxation Phenomena of Electron Irradiated Polyether ether ketone  
K. Shinyama, M. Baba and S. Fujita (Hachinohe Institute of Technology)

- DEI-99-56 Discharge Phenomena in Tree-like Narrow Tube -Effect of Internal Pressure in Narrow Tube on Breakdown-  
Y. Muramoto , M. Nagao (Toyohashi Univ. of Technology) and M. Kosaki (Gifu National College of Technology)
- DEI-99-57 The Effect of Temperature on Dielectric Characteristics of XLPE  
A.Tanaka, T. Tanaka (Tokyo Electric Power Co.), T. Shibata and K. Hirotsu (Sumitomo Electric Ind., Ltd.)
- DEI-99-58 Effect of Temperature on AC Tree Initiation in XLPE  
Y. Shibata, Y. Uno (Nagoya Univ.), N.Shimizu (Meijo Univ.) and T. Mizutani (Nagoya Univ.)
- DEI-99-59 Integral Equation Representation of Partial Discharge Fluctuation  
T. Okamoto, T. Kato, Y. Yokomizu and Y. Suzuoki (Nagoya Univ.)
- DEI-99-60 Prediction of Tree Initiation by Analysis of Discharge Magnitude and Discharge Luminescence at Each Phase Angle  
Y. Fukawa, Y. Ehara, H. Kishida and T.Ito (Musashi Institute of Technology)
- DEI-99-61 The influence of antioxidants on the electrical tree generation in XLPE  
K. Hirota, Y. Sekii, Y. Kanemitsu, N. Kamada (Chiba Institute of Technology)
- DEI-99-62 Fractal Dimension of 3-Dimensional Simulation Tree K. Nakamura, H. Uehara and K. Kudo (Meiji Univ.)
- DEI-99-63 Influence of Long Term Thermo-oxidation on Morphology and Tree Initiation in Polyethylene  
P. Yan, Y.X. Zhou and N. Yoshimura (Akita Univ.)
- DEI-99-64 Conductivity and Permittivity of Water Tree in Polyethylene  
Y. Ohki, S. Mukai, T.Toyoda (Waseda Univ.),Y.Li (Showa Electric Wire & Cable), T.Maeno (Communications Research Laboratory)
- DEI-99-65 The Influence of Morphology on Growth of Water-tree in Polyethylene  
M. Okashita, M. Yamaguchi, S. Wang and T. Shiono (Showa Electric Wire & Cable Co. Ltd.)
- DEI-99-66 An experimental investigation on water tree generation in LDPE & XLPE  
N. Momose, K. Takatorei, Y. Shimada, Y. Sekii (Chiba Institute of Technology) and T. Goto (Toho Chemical Industry Co.,Ltd.)
- DEI-99-67 A Consideration of the Phase Transition Problem for the Discharge Phenomena  
M. Endo, S. Segawa (Chuo Univ.), A. Kumada (Tokyo Univ.) and M.Iri (Chuo Univ.)
- DEI-99-68 Characteristics of Creeping Discharge Developed in Narrow Gap between Insulators  
H. Ueno, H. Masuoka, N. Sakamoto and H. Nakayama (Himeji Institute of Technology)
- DEI-99-69 Reduction of Void Discharge by additives of Azo-Benzene Compound  
M. Okada and Y. Yamano (Chiba Univ.)
- DEI-99-70 Flue gas treatment using barrier discharge III  
K. Toda, K. Takaki, S. Katoh, T. Fujiwara and M. A. Jani (Iwate Univ.)
- DEI-99-71 Jointing of Ceramics by Pulsed Power  
K. Ohkubo, K. Takaki, M. Itagaki, T. Fujiwara (Iwate Univ.), S. Ohshima (Isawa Tsushin) and I. Takahashi (Iwate Industrial Research Institute)

By Mr. Hiroyuki Miyata (Fujikura Ltd.)

## IEEJ Technical Reports Edited by TC-DEI and Related TCs

Technical reports listed here are made by investigation committees in the technical committee on DEI and related investigation committees since the publication of EINA No. 5 (1998). They are described in Japanese.

- No. 688 : "Fundamental properties on discharges in plasma displays", (A), p.80, Sept.,1998, ¥3,429.
- No. 691 : "Low energy electron and ion dynamics and simulation techniques", (A), p.73, Sept.,1998, ¥3,143.
- No. 694 : "Interface phenomena of composite insulation and its evaluation", (A), p.76, Sept.,1998, ¥3,524.
- No. 695 : "Partial discharge measuring techniques for power cable systems", (B), p.116, Sept.,1998, ¥4,476.
- No. 701 : "Present state and trend of analysis for transformers", (B), p.68, Oct.,1998, ¥3,429.
- No. 702 : "Performance evaluation techniques for Gas circuit breakers", (B), p.110, Oct.,1998, ¥4,286.
- No. 704 : "Modeling for Improving Lightning Surge Evaluation", (B), p.140, Nov.,1998, ¥4,952.
- No. 708 : "Inorganic Materials and Processing Technology for Sensors", (E), p.66, Jan.,1999, ¥2,857.
- No. 710 : "Generating Technology of High Power Pulses and Trend of Power Devices", (D), p.86, Jan.,1999, ¥3,238.
- No. 713 : "Trend of Research on Pulsed Extremely High Energy Density State", (A), p.86, Jan.,1999, ¥3,143.
- No. 715 : "Evaluation And Control of Materials in Nano Meter Range with Light and Electron", (C), p.51, Feb.,1999, ¥2,477.
- No. 721 : "Interaction between Discharge and Laser", (A), p.64, Apr.,1999, ¥2,762.
- No. 726 : "Trend of Application Technology for Vacuum Circuit Breakers and Switch Gears", (B), p.48, Apr.,1999, ¥2,477.
- No. 730 : "High Electric Stress Phenomena in Liquid And Its Application Technology to Apparatuses - Toward Next Generation Liquid Insulation Technology", (A), p.116, May,1999, ¥3,429.
- No. 733 : "Digital Measurements of Impulse Voltage And Current, And Its Processing", (B), p.30, July,1999, ¥2,300.
- No. 736 : "Insulation at High Temperature", (A), p.76, Aug.,1999, ¥3,100.
- No. 739 : "Effects of Inverter Surges on Insulation systems", (A), p.64, Aug.,1999, ¥2,400.
- No. 745 : "Technical Trend of DC Cables And Problems in Future", (B), to be published soon.

N. B. : (A - E) after titles mean a Society in which Technical Committees work :

- A : Fundamentals and Materials, in which the TC-DEI is included
- B : Power and Energy
- C : Electronics, Information and System
- D : Industry Applications
- E : Sensors

¥ : Japanese Yen

By Mr. Yoshiyuki Inoue (Toshiba Corporation)

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# TECHNICAL EXCHANGES BETWEEN ASIAN COUNTRIES

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## Conference Records

### The 13th International Conference on Dielectric Liquids (ICDL '99)

The 13<sup>th</sup> International Conference on Dielectric Liquids (ICDL '99) was held on July 20-25, at Nara-ken New Public Hall in Nara, Japan. It was sponsored by IEEE DEIS and supported by "The Commemorative Association for the Japan World Exposition (1970)", "Kansai Research Foundation for Technology Promotion", "Nara Prefecture", and many Japanese Industries. Prof. Katsumi YOSHINO of Osaka University and Prof. Hisanao YAMASHITA of Keio University organized the ICDL '99.

The ICDL '99 was provided an interdisciplinary forum for the exchange and discussion of scientific and technological ideas, knowledge, information, researches and practical experiences on the properties and applications of dielectric liquids. It was addressed to physicists, chemists, material scientists and engineers who are engaged in research and practical application in these fields.

The Hans Tropper Memorial Lecture at the 13<sup>th</sup> ICDL was given by Dr. Werner Fritz Schmidt of Freie University Berlin, Germany, on the topic of "Electrons, Holes and Ions in Non-Polar Dielectric Liquids".

The 55 oral presentations including 10 invited lectures, and 131 poster presentations were reported, and 180 persons from 18 countries were attended the Conference as shown in Table 1.

The next ICDL will be held at Technical University of Graz, Austria, chaired by Prof. Juergen GERHOLD in 2002.

By. Prof. Hisanao Yamashita (Keio University)

### The 3rd Korea-Japan Joint Symposium on Electrical Discharge and High Voltage Engineering (1998 K-J Symposium on ED & HVE)

The 3rd Korea-Japan Joint Symposium on Electrical Discharge and High Voltage Engineering was held on Oct. 19-20, 1998, in Main Administration Bldg. of Pusan National University, Pusan, Korea. It was organized by Electrical Discharge and High Voltage Society of KIEE, Korea, and co-organized by the Technical Committee on Electrical Discharge of IEEEJ, Japan. The chairman of the conference was served by Profs. Kwang-Sik Lee and Chung-Hoo Park. The symposium has been planned to provide the opportunities for scientists and engineers to.

All of the fifty submitted abstracts were reviewed, and forty three papers are accepted and published in *The Proceedings of 1998 Korea-Japan Joint Symposium on Electrical Discharge and High Voltage Engineering*, along with the two invited papers.

First presentations were two primary talks entitled "Discharge in Space Environment" by Dr. Meng Cho, Japan, and "A Comparison of Various After Laying Test Methods applicable to 22.9kV CN/CV Distribution Power Cables" by Prof. J.K. Koo, Korea. Sixteen papers were assigned to the oral sessions and twenty seven papers to the poster session, both sessions covered the topics of High Voltage Testing and Measurement Techniques, Partial Discharges and Diagnostic Techniques, Electrical Breakdown in Vacuum, Gases, Liquids and Solids, Electrical Discharge and their Applications, Electric Field and Their Applications, Electrical Insulation and Lightning.

A number of active discussion and information exchange were conducted during the session as well as coffee break and post-session time. In particular many younger researcher and engineers including master and doctor course students presented their papers and faced to Q & A in English. We believe that this sort of experience by younger students will contribute to their life in future.

Seventy nine participants from four countries: 45 from Korea, 18 from Japan, 3 from China, and 1

from Pakistan, attended the symposium, conference dinner, and post conference tour.  
The next symposium will be held in Kita-Kyushu, Japan on Oct. 25-26.

By Dr. Noriyuki Hayashi,  
(Kyushu University)

1998 K-J Symposium  
on ED & HVE

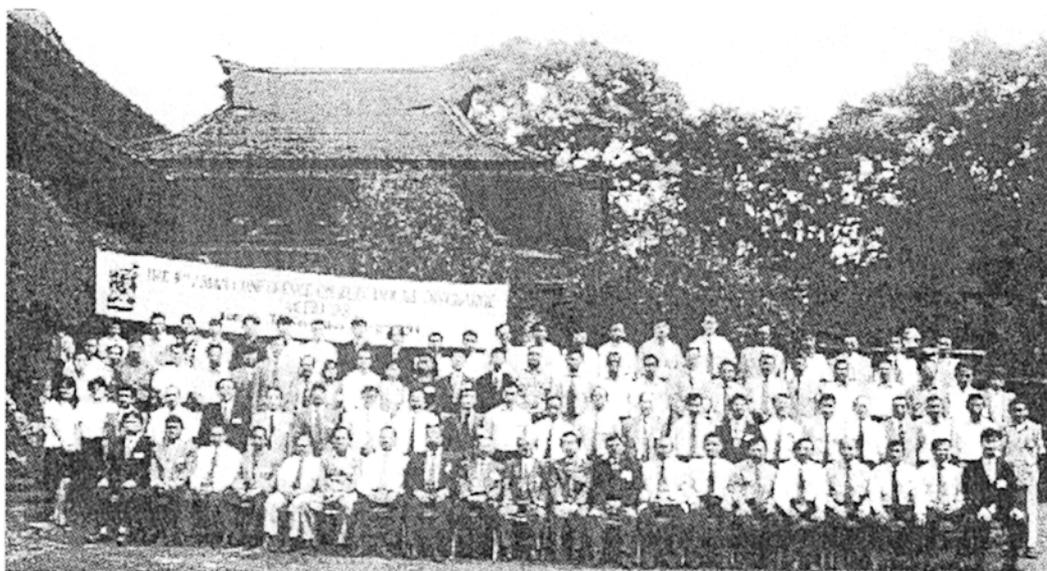


### **The 9th Asian Conference on Electrical Discharge (ACED)**

The 9th Asian Conference on Electrical Discharge (ACED) was held on Nov. 9-11, 1998, in Aula Barat, Bandung Institute of Technology (ITB), Bandung, Indonesia, followed by a one-day technical tour visiting IPTN Aircraft Industry and PT PINDAD Power Industry. The general chairman of the conference was served by Dr. Ir. P.M. Pakpahan. The 1998 ACED was planned to provide an opportunities for scientists and engineers to present and discuss the latest progress in the field of electrical discharge and their applications.

Sixty five papers are submitted and reviewed, and fifty one papers were finally accepted and published in *The Proceedings of the 9th Asian Conference on Electrical Discharge (ACED'98)*. The number of participants were 128 in total including 33 overseas participants from Japan, Korea, Thailand, and so on. In the conference 44 papers were presented in two days and 7 papers from China that appeared in the proceedings were not presented since no authors attended the conference. All authors were requested to represent their papers in both brief oral and longer poster session.

By Dr. Noriyuki Hayashi ( Secretary of ACED Int'l Steering Committee, Kyushu University)



The 9th Asian Conference on Electrical Discharge (ACED) in Bandung, Indonesia

## **Announcement of International Conference to be Held in Asia**

### **The 10th Asian Conference on Electrical Discharge (ACED)**

Asian Conference on Electrical Discharge (ACED) in 2000 is the 10th commemorative one and will be held on Nov. 6-7, 2000, at Kyodai Kaikan, Kyoto, served by Prof. Dr. T. Takuma, Kyoto University, as the chairman of the Organizing Committee. Topics are: 1) Discharge in Gases, 2) Discharges in Liquid and Solid, 3) Discharge along Interfaces, 4) Plasma and Its Application, 5) Lightning and Over-Voltage, 6) High Voltage Equipment and Test Techniques, 7) Electrostatic Precipitators and Applications, 8) EMF-Related Issues and Technologies.

Due Date: Submission of A4 one-page abstract: April 30, 2000  
Notification of Acceptance: June 31, 2000  
Camera ready papers: August 31, 2000

Secretariat: Dr. O. Yamamoto, Kyoto University, o-yamamo@kuee.kyoto-u.ac.jp  
TEL: +81-75-753-5278, FAX: +81-75-753-3337  
Dr. N. Hayashi, Kyushu University, hayashi@asem.kyushu-u.ac.jp  
TEL: +81-92-583-7595, FAX: +81-92-583-7596

By Dr. Noriyuki Hayashi (Secretary of ACED Int'l Steering Committee, Kyushu University)

### **2000 IEEE Power Engineering Society Winter Meeting**

The first PES Winter Meeting of the new millennium will be held from January 23-27, 2000 in Singapore. Arranged in Asia for the first time, this premier power engineering conference will bring together power engineering academics as well as practicing engineers from all over the world.

Contact: PES Winter Meeting 2000 Secretariat, c/o Conference and Travel Management Associates Pte Ltd., 425A Race Course Road, Singapore 218671,  
Telephone: +65 299-8992, Fax: +65 299-8983,  
Email: ctmapl@singnet.com.sg,  
Website: <http://www.ieee.org.sg/peswinter2000>

Due Date: Submission of final manuscript: Oct. 1, 1999  
Notification of final Acceptance: Nov. 12, 1999

### **2000 IEEE International Conference on Properties and Applications of Dielectric Materials (ICPADM 2000)**

ICPDAM2000 will be held in Xi'an Jiaotong University, Xi'an, China on June 21-26, 2000.  
Contact: Prof. Tu De-Min, Department of Electrical Engineering, Xi'an Jiaotong University, Xi'an, Shaanxi, China 710049.  
Telephone: +86 29 32 68 628, Fax: +86 29 32 37 910,  
Email: dmtu@xjtu.edu.cn.

Due Date: Submission of abstract of not more than 300 words: Oct. 31, 1999  
Notification of Acceptance: Mid Dec., 1999  
Camera ready papers: Mar. 15, 2000

### **XIX International Symposium on Discharge and Electrical Insulation in Vacuum (XIX ISDEIV)**

XIX ISDEIV will be held in Xi'an, Shaanxi, China on Sept. 18-22, 2000.  
Contact: Dr. Jia Shenli, Department of Electrical Engineering, Xi'an Jiaotong University, Xi'an, Shaanxi, China 710049.

## **International Conference on Electrical Engineering 2000 (ICEE2K)**

ICEE 2K will be held in Kitakyushu City, Fukuoka Prefecture, Japan on July 24-28, 2000. Topics cover wide areas of Electrical Engineering field.

Due Date: Submission of abstract (about 500 words): Jan. 31, 2000  
Notification of Acceptance: Feb. 29, 2000  
Submission of camera ready papers: May 1, 2000

Conference language: English

If you are interested in attending ICEE2K and presenting a paper, please contact the Conference Secretariat.

Organized by: The Institute of Electrical Engineers of Japan (IEEJ)

Co-organized by: The Korean Institute of Electrical Engineers (KIEE)  
The Chinese Society for Electrical Engineering (CSEE)

ICEE Secretariat: The Institute of Electrical Engineers of Japan  
HOMAT HORIZON Building 8F, 6-2 Goban-cho, Chiyoda-ku, Tokyo 102-0076,  
Japan  
E-mail: [icee2k@iee.or.jp](mailto:icee2k@iee.or.jp), URL: <http://www.iee.or.jp/icee/>  
TEL: +81-3-3221-7313, FAX: +81-3-3221-3704

## **Experience of Lectures in Asian Countries**

### **Experience of Lectures at Universities and Power Companies in P. R. China**

Prof. Kenji Matsuura ( Dept. of Electrical Engineering, Osaka University )

I have had several occasions of giving lectures on insulation diagnostic technology, converter control for HVDC power transmission and electromagnetic induction of overhead transmission lines, at universities and power companies in P. R. China, Korea and Indonesia. Due to limited space, descriptions in this article are limited to my experience in the lectures on insulation diagnostic technology in P. R. China. Since 1991 these lectures has been given at East China Electric Power United Corporation, Xi'an Jiaotong University, North-west Electric Power Institute, Chongqing University and Tsinghua University

In the 1990's, economic growth in P. R. China was remarkable and all the power plants were fully operated. Engineers and researchers in P. R. China, therefore had keen interest in the in-service insulation diagnosis for the power equipments and not much in the off-service insulation diagnosis. This situation was easily suspected in every lecture room. Engineers showed a strong preference for practical technology on the insulation diagnosis for generators, cables, transformers, arresters and the other substation equipments. Researchers in this field had interests in advanced sensor technology, measuring methods and devices. They had their strong awareness of the issues. Most lectures were carried out by speaking through an interpreter who translated Japanese into Chinese. This was chiefly because there were numbers of practicing engineers in the audiences who engaged in the maintenance of power equipments in the field. Occasionally, English was used as the language at university lectures.

If I am not mistaken, they wanted to study on advanced technology of insulation diagnosis for power apparatus developed in Japan. Important points are, not only to lecture on it, but also to show lecturer's respects to the traditional Chinese culture and civilization on which Japanese society has been much influenced. In the introductory remarks at the lectures, I gave talks about Chinese ideograph used

in Japanese writing and Chinese view of nature which would be related to their deep philosophy of science. Unfortunately, it is impossible to introduce the essence of them in English. With editors permission, I dare to show them by the original version. For instance, in the text of 莊子 (雜篇第26外物篇10), we find "目の徹るを明と為し, 耳の徹るを聡となし, 鼻の徹るをせんと為し, 口の徹るを甘となし, 心の徹るを知と為し, 知の徹るを徳と為す, … (This is a sentence as the original Chinese sentence is directly translated into Japanese, where original Chinese characters are mixed with Japanese letters.)" in which we can imagine the essence of modern intelligent sensor technology. Another example "陰陽錯行すれば則ち天地大いに驚く。是においてか, 雷有り霰有り…" is found in the same text of 莊子 (雜篇第26外物篇2), which surprises us with the description of a lightning discharge accompanied by neutralization and transfer of positive and negative charges. The text was actually written in several hundred years BC. These talk at the beginning parts of the lectures aroused their sympathy.

Before and after lectures, there were several occasions of visiting high voltage and electric insulation laboratories where the new generation of young Chinese engineers and students devoted themselves with their whole hearts to their studies. I believe potentialities for the further development of electric insulation technology during the next decade will be great in P.R. China.

## Experience of Research in Japan by Students from Asia

### Impressions on the Research Works in Japanese Universities

Dr. Kai Wu (Nagoya University)

I have become familiar with Japan. From 1995 to 1997, I studied as an exchange student under the guidance of Prof. T. Mizutani and Prof. Y. Suzuoki at Electrical Engineering Department in Nagoya University. Then after I went back to China and obtained my doctor degree from Xi'an Jiaotong University, I came back to Nagoya University and began to work as a postdoctor fellow at the Center for Integrated Research in Science and Engineering since Dec., 1998.

Japan is a beautiful country with good nature circumstance and perfect social order. When I just arrived at Japan, I was astonished by the rapid application of new techniques in practice. Japanese are decorating their country elaborately in every inch by the most advanced techniques. Scientific research works are very active both in universities and in companies. The universities mainly carry out basic scientific researches. And their achievements can be rapidly transferred to the companies for the further practical development.

I very appreciate the good research conditions in Japanese universities. The abundant research funds and the perfect management provide a possible high efficiency for research works. Students and researchers can concentrate their attention in their researches. Various meetings or conferences also provide fluent information communications between universities and industrial companies, as well as sufficient training opportunities for the students.

In Chinese universities, because of the shortage of research funds and the relevant low efficiency with regard to the management sector, both professors and students have to spend a lot of time and energy in searching for economic supports and dealing with the daily trifles. These greatly limit the work efficiency.

Japan and China both belong to the circle of Orient culture. It is not very difficult for me to understand most customs of Japanese people (such as too much modest and politeness), although a Chinese usually behaves a little more directly. Contrasting with the carelessness and flexibility of a Chinese person, a Japanese is usually more conscientious and rigorous (sometimes even a little stiff). These characters of Japanese people are reflected in their strict obedience to the rules and submission to the superior. Although these may have negative influence on the development of personal initiatives, it is also the rigorousness that contributes to the high efficiency of the whole group.

Japan is now on her way to internationalization. More and more foreigners are being involved into

Japanese society. The interactions between different cultures may bring about new vigor and variety in Japan. Certainly, as one of the foreigners, I also gained a lot from not only the research work in the university, but also the communications with surrounding Japanese people.

## **Memories in Waseda University**

Dr. Kwang Soo Seol (Waseda University)

When I remember the last five years in Ohki's Lab of Waseda University as a doctoral student and an assistant researcher, some memories flash across me: the moment when I visited Ohki's Lab for the first time, the moments when I succeeded in measuring photoluminescence from amorphous silicon dioxide films and my first paper was decided to be published, the day when I got a doctoral degree, the congratulation party for my degree, the last seminar before I left the Ohki's Lab, and so on. Among the memories, some were bitter while some were happy.

In February 1994, I visited for the first time Ohki's Lab, Department of Electrical Engineering (presently, Department of Electrical, Electronics, and Computer Engineering), Waseda University as an exchange student between Korea University and Waseda University. At that time, Ohki's Lab located at the building that looks like a big garage or warehouse and places at most remote location in the campus. The first impression is enough to disappoint a foreign student filled with a big expectation. However, such disappointment changed soon to respect when I heard the splendid research achievement from Professor Ohki. With respect, my study in Waseda University started. In the first one year, I was struggling to accustom myself to new environment and new research theme. Since I intended to go to a doctoral course, I expected good results and felt anxiety and irritation about no result as time went on. In October of the year, the happening to blow off my anxiety and irritation took place. I did succeed in measuring photoluminescence spectrum, which I so much expected, from silicon dioxide film formed by implantation of oxygen. Due to such anxiety and success, I was granted admission to a doctoral course and could write a first scientific paper. Under an intense guidance from Professor Ohki, I could finish the first paper. I still remember how happy I was when I knew that the paper was accepted almost as is. After that, three years have elapsed and the time to summarize my doctoral period came. I never forget the moment when my name was called as a doctor of engineering in the graduation ceremony. After graduation, I could continue an assistant researcher in Waseda University. In the last September, the time when I leave Waseda University came. My new post-doctoral position in the Institute of Physical and Chemical Research (RIKEN) was determined. In my last seminar done before leaving Ohki's Lab, I could say how happy my period in Ohki's Lab was. Using this opportunity, I want to present my hearty appreciation for professor Ohki and the students in Ohki's Lab one more time.

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## MISCELLANEOUS

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### Questionnaires Survey for EINA

Comments for EINA by 5 persons from Asia studying in High Voltage Group of Southampton University in UK:

- Have you ever seen this magazine?

YES/NO : 3 / 2

- What kind of news do you expect on this magazine?
  - Some research and achievements directly and closely related with industries
  - The newly developed technique in Electrical Insulation
  - New research project
  - New measurement technology
  - Some new research direction

(Searched by Dr. Yasuhiro Tanaka (Musashi Institute of Technology) in Southampton Univ. UK)

### Application for Membership of IEEJ

A member of IEEJ receives a monthly journal (The Journal of The Institute of Electrical Engineers of Japan) and one transaction out of five (A: Fundamentals and Materials in which the activity of DEI is included, B: Power and Energy, C: Electronics, Information and System, D: Industry Applications, E: Sensors). The journal gives interesting readings about the latest science and technology in the field of Power Energy, Power Apparatus, Electronics, Information Engineering, Materials and so on. The transaction gives review papers, research papers, letters and other information.

Total fee for joining IEEJ as a general member is ¥ 12,400 which consists of initiation fee ¥ 1,200, annual membership fee ¥ 10,000 and overseas postage of journal ¥ 1,200 (¥ : Japanese Yen).

When you need more information or an application form, you can request them from membership section of IEEJ.

### Way for Purchasing Proceedings of IEEJ Technical Meetings and IEEJ Technical Reports

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You can request it to the business and service section of IEEJ or photocopies of specified papers to the library of IEEJ. (The order form is free.)
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       -7312 (Membership Sec.)  
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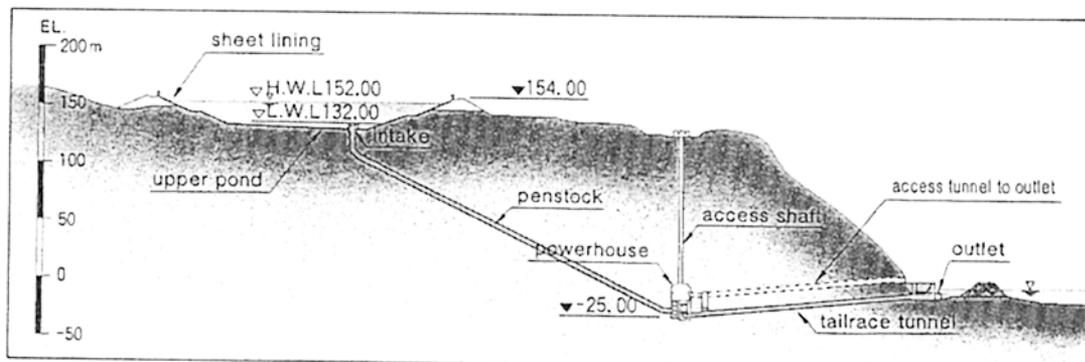
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**Photos of Front and Rear Covers**Front cover:

A demonstration plant of seawater pumped-storage power plant started to operate in March 1999. This is the world's first high head type pumped - storage power plant using seawater. This plant is located in Okinawa island which is in the south of Japan, and is constructed to conserve the land and sea, and the animals and coral occupying those areas. The plant has maximum output of 30MW and a variable speed pumped-storage power generation system, based on gate turn off thyristor converter-inverter ac excitation system. A cross-sectional outline is as a diagram below. The project was implemented by the Electric Power Development Co., Ltd. as entrusted by the Ministry of international Trade and industry of Japan

(The photo is offered by the Electric Power Development Co., Ltd.)



A cross-sectional outline of seawater pumped-storage power plant in Okinawa

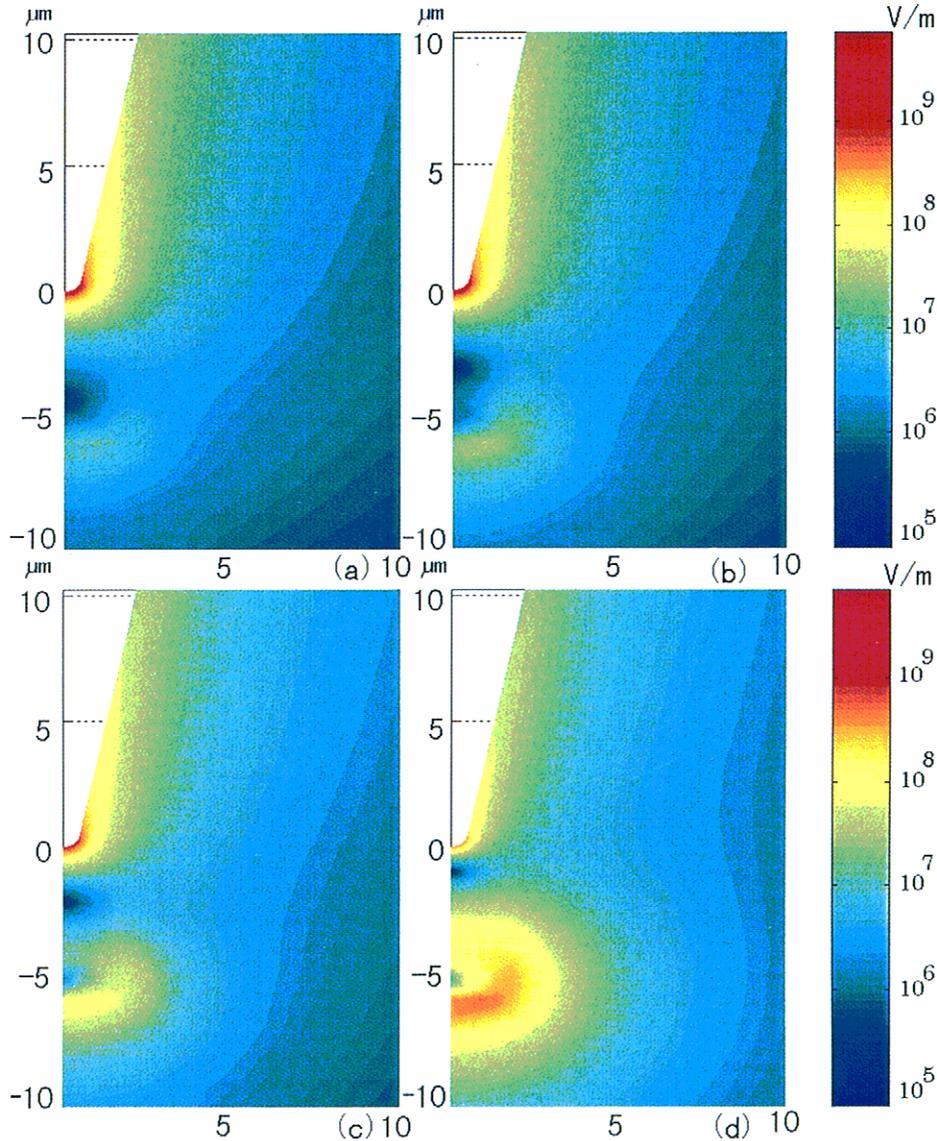
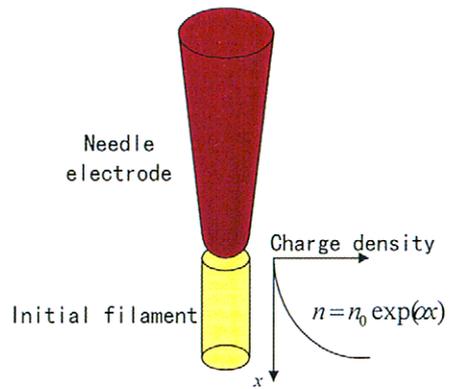
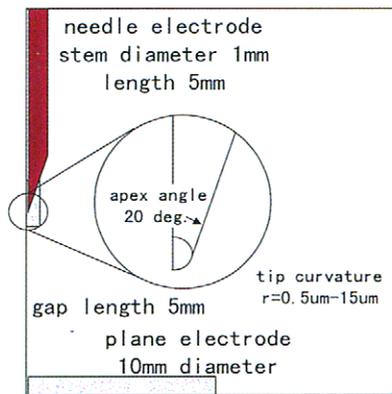
Rear cover:

The electric field distribution between needle to plate electrodes under the existence of primary filament (streamer) in cyclohexane was calculated by 3-dimensional axi - symmetrical finite element method. The effect of injected charge on the field distribution near the tip was shown in the figure. Tip curvature and applied voltage were  $0.5 \mu\text{m}$  and  $-4.9\text{kV}$ , and injected charge were (a)  $0.025\text{pC}$ , (b)  $0.05\text{pC}$ , (c)  $0.1\text{pC}$  and (d)  $0.25\text{pC}$ , respectively.

(By Prof. Hisanao Yamashita, Keio University)

## Members of EINA Committee in DEI

Hisanao	Yamashita	Keio University	(Chairman)
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Haruhisa	Fujii	Mitsubishi Electric Corporation	
Takeshi	Fukui	Sumitomo Electric Industries Ltd.	
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Masanori	Hara	Kyushu Univ.	
Hiroyuki	Hata	Furukawa Electric Co. Ltd.	
Kunihiko	Hidaka	University of Tokyo	
Masaru	Higaki	Kyushu Kyoritsu University	
Takehiko	Iinuma	Nissin Electric Co. Ltd.	
Takashi	Imakoma	NGK Insulators Ltd.	
Mitsugu	Ishioka	Japan Polychem Co.	
Masaki	Kawahigashi	Mitsubishi Cable Industries Ltd.	
Kinya	Kawabata	Kansai Electric Power Co.	
Masamitsu	Kosaki	Gifu National College of Technology	
Kenji	Matsu-ura	Osaka University	
Teruyoshi	Mizutani	Nagoya University	
Youichi	Nojima	Chubu Electric Power Co.	
Syouichi	Ohhata	Tokyo Electric Power Co.	
Yoshimichi	Ohki	Waseda University	
Fujio	Ohsawa	Electric Power Development Co., Ltd.	
Koutaro	Saitoh	Showa Wire and Cable Co., Ltd.	
Yousuke	Sakai	Hokkaido University	
Tatsuo	Takada	Musashi Institute of Technology	
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Ryozo	Takeuchi	Hitachi Corporation	
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