

While the diagnosis of power apparatus is an important research area to Performance failures due to the degradation of electrical insulation in advance. There are unknown phenomena still to be investigated on the degradation mechanism. The following activities have been achieved by the committee;

- (1) Investigation on relationship between the fundamental degradation phenomena such as partial discharge, electrical and water trees, and various electrical signals due to the degradation.
- (2) Investigation on present criteria for determination of the existence of degradation for power apparatus.

The 3~33kV distribution power equipment is subject to investigation of the committee including rotating machine, Cable, transformer, capacitor and switch gear.

The committee has held 24 meetings and discussed on 231 submitted reports as on May 1998. In 1996 the committee sent out questionnaires concerning insulation diagnosis of power apparatus to many industrial users. The committee has submitted nine papers to 96 Asian International Conference on Dielectric & Electrical Insulation 4th Japan-China Conference on electrical Insulation Diagnosis (96AICDEI & 4th-JCEID), October 1996 in Xian China. The committee presented meeting of dielectrics and electrical insulation materials on IEEEJ, October 1997 in Japan. The committee presented symposium on "The Future and Now of Deterioration Insulation Materials and Standardization of Diagnosis for Power Apparatus" on 1998 National Convention of the Institute of Electrical Engineers of Japan.

The committee will be dismissed in December 1998.

Root Principles of Electro-Optic Conversion Functions and their New Application Fields

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The plan of this investigation committee has been drawn up by Y. Murooka, T. Takada and K. Hidaka. This committee started in April 1996 after two years discussion among DEI technical committee members and will be continued until March 1999. The purpose of it is to review the fundamental functions and the physical properties of electro-optic conversion, to understand the essentials of the electro-optic conversion functions, and to propose new engineering applications. Optical measurement techniques using the electro-optic conversion such as electro-optic effect have been developed since 1970's, and some optical devices have been incorporated into electric power systems and also have been implemented to obtain a better physical understanding of dielectric discharge phenomena. Typical examples characterizing the electro-optic conversion functions are: Pockels effect, Kerr effect, Faraday effect, electrogyration effect, magnetic Kerr effect, opto-magnetic effect, optical anisotropy of liquid crystal and so on. As each effect has been independently applied to some engineering fields, many useful effects will be systematically reviewed and discussed in this committee.

The items of survey are:

- (1) Physical root principle of electro-optic conversion functions (electro-optic effect, magneto-optic effect, opto-elastic effect, nonlinear optic effect, optical phase conjugate effect, optical anisotropy),
- (2) Application technology of electro-optic conversion functions (sensors, energy conversion technology, optical telecommunication),
- (3) Essential components for application of electro-optic conversion functions (light sources, optical fibers, optical crystals, photodetectors, signal processing, image processing), and
- (4) Feasibility of new application of electro-optic conversion functions.

This committee consists of chairperson (K. Hidaka), two secretaries (T. Maeno and S. Inoue) and 26 members from 11 universities and 15 companies. Six technical meetings are scheduled to be held in a year. One or two experts will be invited to every meeting to give lectures in their individual field relevant to electro-optic interaction and conversion and to discuss related items with committee members. The three years activity of the committee will be published in Technical Report of IEEEJ.