

Activity of Technical Committee on Metal and Ceramics

Welcome to our Technical Committee on Metal and Ceramics (TC-MC) in the Institute of Electrical Engineers of Japan (IEEJ). It is expected the TC-MC to promote the electrical materials and related technologies. Therefore, we have the pleasure to inform activities of the TC-MC and to communicate with each other.

Mission of TC-MC

The metal and ceramic materials are indispensable to electric and electronic fields and in front of advanced technologies all the time. In the twenty-first century, many advanced technologies need promising materials such as new materials or new functional materials for the diversification and renewable society. Therefore, the metal and ceramic materials are significant still more and will play an important role as a pioneer in the future.

As shown in figure 1, the activities of the TC-MC have been covering mainly electric, electronic and optical materials, and their technologies. Namely their functions are extended such as superconductivity, normal conductivity, semi-conductivity, mechanical strength, heat transfer, thermoelectric, photo-electricity, optical transmission, electrochemical affinity, radio-activity, composites etc.

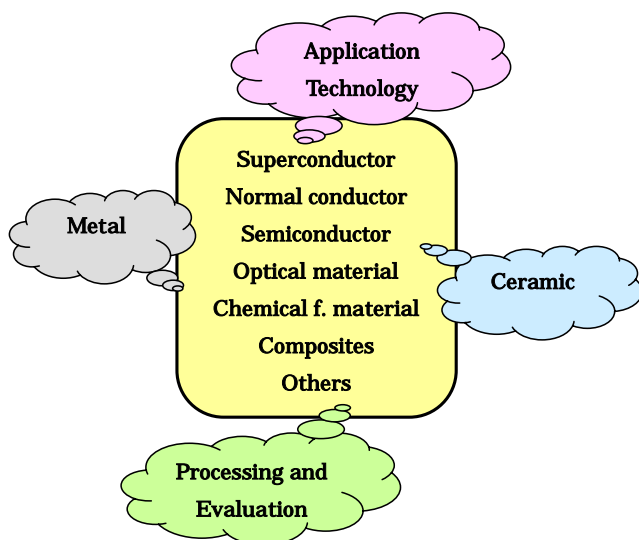


Figure 1 Activity scope of the TC-MC

Furthermore, our activities have been covering data base on their processing technologies and their evaluations in order to fit any applications.

History of TC-MC

The technical committee on the electrical materials in the IEEJ, predecessor of the present the TC-MC has been already set up in 1979. With several reorganizations of the technical committees, the TC-MC under the Fundamental and Materials Society (called A-Society) has been established in 1999 with other eleven technical committees, Research and Education, Electromagnetic Theory, Plasma Science and Technology, Electromagnetic Compatibility, Pulsed Electromagnetic Energy, Electrical Discharges, Light Application and Visual Science, Insulation and Measurement, Dielectrics and Electrical Insulation, Magnetics, and History of Electrical Engineering.

Recent activities of TC-MC

The activity of the TC-MC is based on the Symposium in the National Convention of the IEEJ, the Investigation Committee and the Study Meeting under the TC-MC. The following introduces the recent Symposiums in the National Convention of the IEEJ and Study Meeting under the TC-MC as shown in Table 1 and Table 2, respectively and the third activities will be found in the next section.

Regularly, the TC-MC meetings are held four times a year. The main topics to be discussed in the regular meetings involve introduction and understand for advanced metal and ceramics, and development of our TC-MC itself. Last three years, we provided new three technologies and related materials such the attractive carbon nano-tube and the functional diamond.

Recent year, much attention has been paid on an investigation on advanced electrode materials for future batteries and fuel cells to be compatible with clean, green, renewable and sustainable society.

Last year, two study meetings were held in TC-MC, in which one meeting held on November 28 was jointed with TC-Magnetics.

Table 1 Symposiums in the National Convention of the IEEEJ

Theme	Date	Site
Attractive carbon nano-tube as a new electric and electronic material	2004.03.17	Aoyama-Gakuin University
Remarkably advanced diamond for electric and electronic materials	2005.03.17	Tokushima University
Electrode materials for fuel cells and the secondary batteries	2006.03.17	Yokohama National University

Table 2 Study Meetings in TC-MC including a Joint Meeting

Theme	Date	Site
Magnetic materials, general magnetic applications, and nano-scale superconductors*	2006.11.28	Yokohama National University
Advanced electrode materials for fuel cells and a field trip	2006.12.05	Gas-no-Kagakukan in Tokyo Gas Co., Ltd.

Note * This meeting was jointed with Technical Committee on Magnetics in IEEEJ

Activities of Investigation Committee in TC-MC

As of 2007, there is one investigation committee under TC-MC as shown in Table 3, the name of which is "Fabrication technologies and characterizations of advanced superconducting materials". The chairperson and secretary are Dr. Hiroaki Kumakura (National Institute for Materials Science, NIMS) and Dr. Takao Takeuchi (NIMS), respectively. Regularly, there are six meetings a year.

The meetings discuss fabrication technologies and evaluations on electromagnetic, thermal and mechanical properties mainly for Nb₃Al conductors, Bi-based oxide superconductors, MgB₂ conductors and

Y-based oxide superconductors. Most expecting investigation results are fabrication technologies to produce a long-length wire for MgB₂ and Y-based oxide, and their cost performances as the practical superconductors and their applied technologies to such as persistent current mode-coils, cables, transformers, fault current limiters and so on. As an intermediate result, 3-1¥/Am-coated conductors of the Y-based oxide superconductor will be available in the near future.

Table 3 Investigation Committees under the TC-MC

Research Subject	Chairperson (Affiliation)	Period	Remarks
Superconducting materials and electronic devices	Nobuyuki Yoshikawa (Yokohama National University)	1999.10-2002.09	Close
Wire and conductor forming of superconducting materials	Shirabe Akita (CRIEPI)	2001.10-2004.09	Close
Fabrication technologies and characterization of advanced superconducting materials	Hiroaki Kumakura (NIMS)	2004.10-2007.09	Active

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Chairperson: Yasuzo Tanaka (International Superconductivity Technology Center)

Secretary: Masanao Mimura (The Furukawa Electric Co., Ltd.).