

Aims and scope:

Magnetic materials can contribute to saving electric power and reducing CO₂ emissions in multiple ways. For example, the conversion of electrical energy into mechanical work and vice versa is done using electric motors and generators, respectively, which imply the use of hard and soft magnetic materials. Permanent magnets play an essential role in improving the efficiency of electricity transmission and utilization and in the progressive replacement of oil-based fuels in transportation by electric motors. For electric vehicles, magnetic materials have to retain their properties up to moderately high temperatures, which is demanding for most of the materials currently in use. Advanced amorphous and nanocrystalline soft magnetic materials are also of interest for inductors/transformers in high frequency power electronics components and power conditioning systems. Thus, optimizing soft and hard magnetic materials and to extend the temperature span in which they are applicable can imply a notable enhancement in the energy efficiency of these devices.

There are also a few new applications of magnetic materials which can help us reach larger energy efficiency. One of them is magnetic refrigeration, associated to the magnetocaloric effect. Taking into account that the largest electricity consumption in the domestic market is related to refrigeration and air conditioning, the improvement of these devices via the use of magnetic technologies will translate into a large reduction in energy consumption.

This symposium will focus on the optimization of magnetic properties for energy applications, covering soft and hard magnetic materials, magnetic materials for high temperature applications and magnetocaloric materials. The synthesis, processing, characterization and property evaluation of the materials placing an emphasis on microstructure-property relationships will be discussed.

A panel session on the requirements of magnetic materials for current technological applications, with participants from industry and academia, will be organized.

Invited speakers and panelists include:

S. Bedair (Army Research Office); **C. Binek** (Nebraska); **R. Burriel** (CSIC); **D. Fruchart** (CNRS); **K.A. Gschneidner Jr.** (Ames Lab); **G. Hadjipanayis** (Delaware); **R. Hasegawa** (Metglas, Inc.); **D. Haskel** (Argonne National Lab); **S. Hirosawa** (Hitachi Metals); **K. Hono** (NIMS); **F. Johnson** (GE); **H. Kato** (Yamagata); **L.F. Kiss** (Hungarian Academy of Sciences); **M. Komuro** (Hitachi); **S. Konda** (Toyota); **M.J. Kramer** (Ames Lab); **J.P. Liu** (Texas Arlington); **J. Liu** (Electron Energy Corporation); **J. Lyubina** (Imperial College); **M.E. McHenry** (Carnegie Mellon); **T. Minowa** (Shin-Etsu Chemical Co. Ltd.); **M. Ohta** (Hitachi Metals); **D. Paudyal** (Ames Lab); **V.K. Pecharsky** (Ames Lab); **R. Ram** (MIT); **T. Schrefl** (Sheffield); **T. Shima** (Tohoku Gakuin); **R.D. Shull** (NIST); **I. Skorvanek** (Slovak Academy of Sciences); **Y. Spichkin** (AMT&C); **H. Srikanth** (University of South Florida); **I. Tanaka** (Sumimoto Metals); **M. Vázquez** (CSIC); **M.A. Willard** (Naval Research Lab); **T. Woodcock** (IFW); **A. Yan** (Ningbo)

Organizers:

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Sponsors:

- The Minerals, Metals and Materials Society (Energy Conversion and Storage Committee; Magnetic Materials Committee)
- JSPS, 147th Committee

Economical support:

Limited funds will be available to partially cover the expenses of postgraduate students attending the symposium to present their work. At the moment of writing this flyer, these bursaries are provided by [Lakeshore](#) and [AMT&C](#). Students interested in applying for this support should contact the organizers or use [this form](#).

Deadline for abstract submission (Extended): 31 July 2010

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