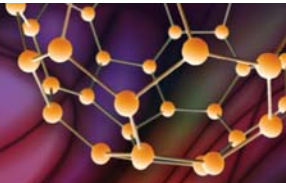




2009 MRS
fall meeting
Boston, MA • November 30-December 4



Abstract Deadline: June 23, 2009
www.mrs.org/fall2009

REMINDER:
In fairness to all potential authors,
late abstracts will not be accepted.

CALL FOR PAPERS

MRS Symposium G: Magnetic Shape Memory Alloys

Combining more than one ferroic property within one material boosts the possibility to use these materials. This is especially the case for magnetic shape memory alloys (MSMA) that combine magnetic order with a martensitic transition. The coupling of magnetic order and martensitic instability, or alternatively the coupling of microstructure and magnetocrystalline anisotropy, enables using an external magnetic field as a control parameter, which renders this class of smart materials suitable for several actuation and sensing applications.

Although the large potential of magnetic shape memory alloys for novel devices is already apparent, it is unclear how the different relevant length scales are connected. Current experimental and theoretical approaches aim to bridge the gap between the understanding at the atomic unit cell level and phenomenological models. The highly magnetostrictive Fe-Al, Fe-Ga, and Co-Fe solid solutions may be considered a subclass of MSMA as the mesoscopic mechanism responsible for the enhanced striction is related to a martensitic transformation. It is planned to dedicate one, or possibly two, sessions of the proposed symposium to this novel class of materials. Applications of these materials are already under development; but, like in MSMA, the understanding of the coupling of the micro-, meso-, and macroscopic-length scales is equally incomplete.

This symposium will cover the complete range of magnetic shape memory and related alloys from fundamentals toward applications. Interdisciplinary topics related to physics, materials science and engineering will be connected by invited talks in order to accelerate the development of these materials toward applications. The closing session will be dedicated to a comparison with related materials which should motivate a discussion toward generalized models for smart materials.

Topics addressed in this symposium will include (but not be limited to):

- Theory and modeling of the MSMA on different length and time scales
- Advanced characterization of the coupling of (micro-)structure and magnetism
- Bulk and thin film magnetic shape memory materials with enhanced properties
- Near magnetic shape memory materials (Fe-Al, Fe-Ga, Fe-Co)
- Actuation mechanisms of magnetic shape memory alloys
- Integration into novel applications and devices

A tutorial complementing this symposium is tentatively planned. Further information will be included in the MRS Program that will be available online in September.

Invited speakers (tentative) include:

M. Acet and **P. Entel** (Univ. Duisburg-Essen, Germany), **J. Feuchtwanger** (Univ. of Bilbao, Spain), **A. Flateau** (Univ. of Maryland), **Y. Furuya** (Hirosaki Univ., Japan), **R. Kainuma** (Tohoku Univ., Japan), **I. Karaman** (Texas A&M University), **M. Laver** (National Inst. of Standards and Technology), **A. Ludwig** (Univ. Bochum, Germany), **V. L'vov** (Univ. of Kiev, Ukraine), **L. Manosa** (Univ. of Barcelona, Spain), **J. McCord** (IFW Dresden, Germany), **P. Muellner** (Boise State Univ.), **K. Neumann** (Loughborough Univ., United Kingdom), **S. Seelecke** (Carolina State Univ.), and **O. Soederberg** (Helsinki Univ. of Technology, Finland).

Symposium Organizers

Eckhard Quandt

University Kiel, Faculty of Engineering, Institute for Materials Science,
Kaiserstr. 2, D-24143 Kiel, Germany
Tel 49-431-880-6200, Fax 49-431-880-6203, eq@tf.uni-kiel.de

Manfred Wuttig

University of Maryland, Dept. of Materials Science,
College Park, MD 20742
Tel 301-405-5212, Fax 301-314-9467, wuttig@eng.umd.edu

Tomoyuki Kakeshita

Osaka University, Graduate School of Engineering,
Division of Materials and Manufacturing Science,
2-1 Yamada-oka, Suita Osaka 565-0871, Japan
Tel 81-6-6879-7482, Fax 81-6-6879-7485
kakesita@mat.eng.osaka-u.ac.jp

Sebastian Fähler

IFW Dresden, Leibniz-Institute for Solid State and
Materials Research Dresden, Institute for Metallic Materials,
Helmholtzstr. 20, D-01069 Dresden, Germany
Tel 49-351-4659-588, Fax 49-351-4659-9588
s.fahler@ifw-dresden.de