SPECIAL LECTURE

Ways to reversible magnetic properties

March 6, 2017, 11:30 AM at Raman Seminar Hall
Department of Physics, Pondicherry University

by

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Biography

Horst Hahn studied Materials Science at the Universität des Saarlandes and received his Ph.D. from the Technische Universität Berlin.
He was then a post doctoral fellow at the Universität des Saarlandes and from 1985 to 1987 a Research Associate in the Materials Science Division at Argonne National Laboratory. Subsequently, he was Research Assistant Professor in the Materials Research Laboratory at the University of Illinois at Urbana Champaign for two years.
In 1992, he became Associate Professor of Materials Science at RutgersThe State University of New Jersey.
From 1992 to 2004 Horst Hahn was Full Professor in the Department of Materials Science at Technische Universität Darmstadt and Head of the Thin Films Division.
Since April 2004 Professor Horst Hahn is Executive Director of the Institute for Nanotechnology at the Karlsruhe Institute of Technology (KIT) and Director of the Research Laboratory Nanomaterials located at the Technische Universität Darmstadt. Professor Hahn was one of the cofounders of SusTech Darmstadt GmbH&Co KG, a startup company in the area of sustainable chemistry and nanotechnology and is Honorary Professor at the University of Hyderabad, India, Lanzhou University, Lanzhou, China **and Distinguished Professor of the Indian Institute of Technology Madras, Chennai,** India. His main research interests are in the areas of synthesis, characterization and physical and chemical properties of nanostructured materials in the form of thin films, nanoparticles and bulk materials.

Abstract:

The reversible change of magnetic properties is of interest for basic science and for many applications. A variety of physical principles to control magnetic properties, i.e. gating using di- and ferroelectrics, and electrolytes, have been used for different nanostructured materials in various morphologies (dense (epitaxial) and porous thin films, and nanoporous structures). The general concepts will be emphasized and some specific examples will be addressed. This includes thin LSMO films gated by epitaxially grown ferroelectic films, thin LSMO films gated by ionic liquids, nanoporous LSCO and LSMO films gated by electrolytes. Furthermore, an extension of the magnetoelectric effects to include reversible ion-intercalation driven magnetic control is shown, which can be pertinent to bulk material volumes. This concept is demonstrated for various ferromagnetic spinel oxides, where a large and fully reversible change in room temperature magnetization is observed. The measurements of the reversible changes of magnetic properties are accompanied by detailed structural characterization using XRD, HRTEM and Mössbauer spectroscopy. From these results the origin of the observed changes of the magnetic properties can be determined. The experimental work is supported by theoretical efforts.

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