MONOGRAPH SERIES IN PHYSICAL SCIENCES

Exchange Bias

From Thin Film to Nanogranular and Bulk Systems

Edited by
S. K. Sharma

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Physics

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This timely book covers basic mechanisms, characterization, theoretical simulations, and applications for exchange bias in granular nanosystems, thin films, and bulk systems. After an overview of the field and key principles, the next section covers nanogranular (core-shell) systems, followed by chapters on thin films, bilayers/multilayers nanostructures, dilute magnetic semiconductors, and multiferroic systems. A final section turns to bulk systems, such as those consisting of perovskite structures, rare earth-transition metal intermetallic, and ion implantations.

Readers of this book will obtain

- A complete, modern overview on exchange bias phenomena, covering synthesis, characterization techniques, and applications
- An introduction to all the important phenomenological models proposed for thin films, bulk materials, and nanoparticles
- Detailed discussion of the importance of size, shape, cooling field, and temperature on exchange bias properties
- Understanding of novel applications of exchange bias systems

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Preface

This book has been developed as an overview of exchange-coupled magnetic systems for an audience of graduate students and scientists in both academic and industrial sectors. It provides a broad overview of several existing studies concerned with the understanding of exchange bias in magnetic nanostructures, presenting key examples from thin films to nanogranular and bulk systems.

This contributed volume shares the up-to-date progress in the area of exchange bias with an in-depth investigation of the cutting-edge developments on this particular subject. The first chapter serves as an introductory material, thereby enabling it to serve as a first text for researchers working in the area of magnetism and exchange bias.

This book has been intended as a forum for the critical evaluation of many aspects of exchange bias phenomenon that are at the forefront of research in the magnetism industry. Chapter authors have also been encouraged to present the highlights from the extensive literature on the topic, including the latest research in this field.

Editor

S. K. Sharma, PhD, is an assistant professor in the department of physics and group leader and coordinator of the Functional Nanomaterials Laboratory at the Universidade Federal do Maranhão (UFMA), São Luis, Brazil. Dr. Sharma obtained his PhD degree in July 2007 from H. P. University, Shimla, India. He has previously worked several years in research/academic positions in Brazil, France, Czech Republic, India, and Mexico, focusing on the area of nanomagnetism and functional nanomaterials. At present, he is an active member of postgraduate research program at UFMA and actively involved in research, teaching, and supervising research students at undergraduate/postgraduate levels. He has been awarded FAPEMA Senior Researcher grants and to date has published more than 60 peer-reviewed articles, 2 books as a single author, 3 book chapters and 4 articles in national level proceedings and has attended numerous international conferences.

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