Recent Developments in Magnetic Materials for Magnetic Recording, Spintronics and Permanent Magnets
- Magnetic Anisotropy -

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Host: Associate Professor S.N. Piramanayagam

Abstract

Magnetic materials are classified into three types; “Hard”, “Soft” and “Semi-hard”. One of the key physical quantities to govern such properties is “Magnetic anisotropy”. The energy of magnetic anisotropy varies over a range of 10-3 to 102μeV/atom, much smaller than atomic binding energy (a few eV/atom) and exchange energy (10~103 meV/atom). Nevertheless, it plays a key role in magnetic characteristics.

There has been much development in basic and applied magnetism, leading to the significant technological impacts in magnetic recording, spintronics and permanent magnets. Those developments were only made possible through developing and controlling magnetic anisotropy in magnitude and direction for magnetization. The talk presents first the overview of the recent development of high magnetic anisotropy materials. Some of our works performed on rare-earth free permanent magnets such as Mn-Ga and Mn-Bi thin films will be discussed.

Short Biography

He received his BS and MS degrees from Waseda University in Tokyo in 1962 and 1964, respectively and PhD degree from Department of Electrical Engineering, California Institute of Technology, Pasadena, California in 1969. He worked as a postdoctoral fellow at Max Planck Institute in Stuttgart, Germany from 1969 through 1972, and then was an associate professor at Tohoku University, Sendai, Japan from 1972 through 1988. He worked as a senior research scientist at IBM Almaden Research Center, San Jose, California from 1988 through 2000. He was Vice President and principal professor of Toyota Technological Institute, Nagoya, Japan from 1995 through 2010. Since 2010, Dr Suzuki is Director for MINT Center and Professor of College of Engineering, The University of Alabama, USA.

His research field includes magnetism and magnetic materials, energy storage materials and related devices. He has published more than 310 scientific papers in peer review journals, has written and or edited 4 books including “Magneto-optical Recording Materials” with Dr. Dick Gambino, and holds 17 patents licensed in U.S.A., Japan, Singapore, and other countries.

Dr. Suzuki has received the IEEE Magnetic Society Achievement Award (2015), the Society Award of the Magnetics Society of Japan (2010), IEEE Magnetics Society Distinguished Lecturer Award (2007), Technical Achievement Award of the Magnetics Society of Japan (1999), and Ogawa Award (1986).

Professor Suzuki was the past president of the IEEE Magnetics Society (2011 and 2012). He is a life fellow of IEEE and also of the Magnetics Society of Japan. Dr. Suzuki is Professor Emeritus of Toyota Technological Institute.