FOREWORD

Special Section on Advanced Elementary Technologies for Information Storage

The rapid evolution of the internet and the increasing use of cloud computing require storage of massive amounts of information. Magnetic recording, especially in the form of very high capacity disk or tape drives, provides the highest recording densities and superior cost per bit and will continue as the preferred storage technology in this age of "big data". Especially, hard disk drives (HDD) have enabled massive digital storage for applications and contents since their first appearance and have become indispensable for information storage. However, we must overcome difficult problems related to form and to detect fine recorded patterns, such as to maintain thermal stability and to improve signal to noise ratio. Therefore, it has become an urgent matter to establish technologies to solve these problems. In other words, magnetic recording is at a critical juncture where conventional recording technology is running out of steam and the emphasis is now on exploring new technologies and novel ideas to maintain growth in areal-density. This is an exciting time for the industrial as well as academic viewpoint. The special section highlights the state-of-the-art technologies related to the high density recording system and is planned to promote research and development of future information storage devices.

For this section, 12 contributed papers were accepted in this special section after careful review. These papers treat wide variety of new technologies for information storage related to microwave assisted magnetic recording (MAMR), heat assisted magnetic recording (HAMR), bit patterned media (BPM), two-dimensional coding and improvements of conventional recording systems. The new promising technologies, such as holographic data storage and domain wall memory in nano-wire are also referred. Moreover, this section includes two review papers on epitaxial growth of Co/Pd multilayer and on metastable ordered phase formation in Co-Pt alloy films on single-crystal substrates, which provide basic understandings of the origin of magnetic anisotropy in the future recording media.

The editorial committee members hope that this special issue encourages researchers and promotes future research activities in the relevant fields of study. Finally, they would like to express their appreciation to all the authors for their valuable contributions and to reviewers for their great efforts in completing the review process.

Shigeki Nakagawa, Guest Editor-in-Chief

Shigeki Nakagawa *(Member)* received the B.S. and M.S. degrees in electrical engineering from Kanazawa University, Japan, in 1983 and 1985, respectively. He joined Tokyo Institute of Technology as a research associate in the Department of Physical Electronics. He received Ph.D. from Tokyo Institute of Technology in 1994. He is now Associate Professor in the Department of Physical Electronics, Tokyo Institute of Technology. He is engaged in research on thin film deposition technology using the sputtering method and in preparation of magnetic thin films used in the magnetic recording devices. He has mainly studied Co-Cr alloy thin films used in perpendicular magnetic recording media and has established several kinds of deposition technologies. He is also working to develop deposition technologies for soft magnetic thin films used in recording heads, GMR multilayers and spin valve devices, Co-based thin films used in longitudinal recording media and oxide thin films, such as ferrite. He received the best paper award at the 5th International Conference on Ferrites in 1989, and the best paper award for young scientist and engineers at the 3rd IUMRS-ICAM-93. Dr. Nakagawa is a member of the Japan Society of Applied Physics, The Institute of Electrical Engineers of Japan, The Magnetic Society of Japan, The Surface Finishing Society of Japan and The Japan Society of Powder and Powder Metallurgy.