FOREWORD

Special Section on Recent Progress in Superconducting Analog Devices and Their Applications

Since the discovery of high-temperature superconductors (HTS), enormous efforts have been dedicated to the research and development toward application of these materials to electronic devices. Among them, superconducting analog devices such as microwave filters and superconducting quantum interference devices (SQUIDs) have been expected to be the first commercial products because of their rather simple structures including only one HTS film in most cases. Actually, superconducting receiver subsystems in which HTS receiving filters are cooled together with a low-noise semiconductor amplifier by a compact cryocooler have been introduced to wireless base stations in the United States.

In Japan, though high performance of the receiving subsystem was demonstrated only in field tests, there has recently been much progress in the developments of HTS transmit filters with high power handling capability for base stations or receiving filters at 5 GHz bands for weather radar systems. A variety of inspection systems with HTS SQUIDs including those for metallic contaminant detection, LSI failure analysis, and magnetic immunoassays have been developed. The metallic contaminant detection systems have been introduced into a food factory, and are expected to be applied to other industrial products. Transition-edge sensors using low-temperature superconductors have been also developed with the aim of application to energy dispersive spectrometers for electron microscopes.

The purpose of this Special Section is to introduce these pioneer works originated from Japan to readers all over the world and stimulate research and development in the superconductive electronics and wider related fields. On behalf of the editorial committee, I would like to express our great thanks to all the authors of invited and contributed papers submitted to this Special Section and to all reviewers. I expect this Special Section to contribute to further progress in this field and earlier commercialization of superconducting electronic devices.

Finally, I would like to thank all the editorial committee members listed below for their enthusiastic efforts to this editorial work.

Keiichi Tanabe, Guest Editor

Keiichi Tanabe *(Member)* received his B.E, M.E., and Ph.D. degrees in applied physics from the University of Tokyo in 1977, 1979, and 1988, respectively. In 1979, he joined the Electrical Communication Laboratories of Nippon Telegraph and Telephone Corporation, Ibaraki, Japan, where he worked on the research of superconducting thin films and Josephson junctions for electronic applications. From 1987 to 1988, he was with the School of Applied and Engineering Physics, Cornell University, as a visiting scientist. In 1995, he joined the SRL-ISTEC, Tokyo, Japan, where he has been working on the research and development of high-temperature oxide superconducting materials, thin films, and electronic devices. He is currently Director of Electronic Devices Division and also Director of Advanced Materials and Physics Division. Dr. Tanabe is a member of the Japan Society of Applied Physics, the Physical Society of Japan, and the American Physical Society.