

SPECIAL ISSUE ON APPLICATIONS OF NOVEL SENSORS AND RELATED TECHNOLOGIES FOR INTERNET OF THINGS PART 1-1

PREFACE



In recent years, applications of novel sensing and related technologies to electronic and mechanical devices have become very popular fields. The booming economic development in Asia, particularly the leading manufacturing industries from automobile, machinery, computer, communication, consumer products, and flat-panel displays to semiconductor and micro/nano applications have attracted intense attention from universities, research institutions and many industrial corporations. Manufacturing is the economic lifeline of a country and has been regarded as a labor-intensive industry. In order to cut production costs, devices for the Internet of Things have been widely developed. The Internet of Things is composed of integrated end devices and facilities, such as intelligent sensors for internal control, industrial systems, mobile terminal systems, floor control systems, and home intelligent facilities. Smart devices and external control information are utilized with the hope of attracting companies that manufacture high-value-added products in the aerospace, automotive, IT mold, textiles, optoelectronic, watches, medical device, automation, energy, and semiconductor-related parts and components fields. Therefore, the key to maintaining a competitive advantage in domestic manufacturing in the future is to continue to rely on the development of novel manufacturing and precision machinery-related technologies.

The scope of this Special Issue, entitled “Applications of Novel Sensors and Related Technologies for Internet of Things”, covers fundamental sensors and materials used in electronic, mechanical, and electrical engineering, including their synthesis and integration with many elements, the design of electronic and optical devices, sensing technologies, evaluation of various performance characteristics, and exploration of their wide-ranging applications in areas such as industry, environmental control, and materials analyses. In part 1-1 of this special issue 11 excellent papers in five categories of sensors and materials fields have been selected.

(1) Physical Mechanical Sensors: “Analysis and Design of NdFeB N35 Permanent Magnetic Holding Device Using ANSYS Maxwell Simulation” by Wang *et al.*, “Dynamic Stability Analysis of Magnetically Levitated Rotor in a Nutation Blood Pump” by Chen and Wang, and “Real-time Thermal Error Compensation of Machine Tools Based on Machine Learning Model and Actual Cutting Measurement via Temperature Sensors” by Chen and Wang.

(2) Bio/Chemical Sensors: “Surface-acoustic-wave-based Ammonia Gas Sensors Using MoS₂/SiO₂ Composites” by Chung *et al.*

(3) Materials: “Analysis of Composition Formulas for Face-centered Cubic Solid Solution Alloys via Nearest-neighbor Two-shell Structure with Cowley Parameters” by Hong *et al.*

(4) Related Technologies: “Comparative Analyses of Absorptivity of Broadband Absorber in Visible to Near-infrared Range by Different Simulation Software: COMSOL and Finite Difference Time Domain (FDTD)” by Chen *et al.*, “Autonomous Multitask Driving Systems Using Improved You Only Look Once Based on Panoptic Driving Perception” by Lin *et al.*, “Digital Image Processing under Modified Core Function Based on Residue Number System” by Liao *et al.*, and “A Flexible State Space Model for Large Language Models: The GroupMamba Approach” by Liu *et al.*

(5) Sensor Applications: “Using the Finite Element Simulation Software Ansys to Analyze the Stress and Strain Generated in the Eyeball due to Pressure When Subjected to Compression” by Cai *et al.* and “Applying Fuzzy Theory to Enhance the Longitudinal Control of Miniaturized Electric Unmanned Aerial Vehicles” by Wu *et al.*

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