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## *Preface*

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Thermodynamic studies have long played a very important role in various aspects of science and technology. In 1997, to open a new horizon in the research field, the International Symposium on the New Frontiers of Thermal Studies of Materials was planned by a group of active members of the Japan Society of Calorimetry and Thermal Analysis (JSCTA) with the vision and leadership of professor Tooru Atake [Tokyo Institute of Technology (TIT)]. The first Symposium was held at Yokohama Campus of the TIT on 26–27 October, 1998, which was supported by the Ministry of Education, Culture, Sports, Science and Technology, Japan, under the auspices of the JSCTA, and the Society of Promotion for Calorimetry and Thermal Analysis, Japan. The second Symposium was held at the same place on 25–27 November, 2001, which was also supported by the Ministry, Japan, and under the auspices of 29 societies. 166 delegates (including 24 from overseas) attended the symposium and 87 papers were presented orally and/or by posters. Since the great success was achieved in the two symposia, this symposium was decided to be held regularly every three years.

The Third International Symposium on the New Frontiers of Thermal Studies of Materials was held at the University Hall, University of Tsukuba, on 28–30 November, 2004. The Symposium was supported by the JSCTA, the Graduate School of Pure and Applied Sciences, University of Tsukuba, the Society of Promotion for Calorimetry and Thermal Analysis, Japan, and the Science and Technology Promotion Foundation of Ibaraki, Japan, and it was under the auspices of 29 societies. As in the former two meetings, the Symposium was chaired by Professor Tooru Atake, the current president of the JSCTA. The members of the organizing committee were Prof. Kazuya Saito (Executive Secretary, University of Tsukuba), Dr. Hideyuki Kato [National Institute of Advanced Industrial Science and Technology (AIST)], Prof. Hitoshi Kawaji (TIT), Mr. Yoshitaka Shimizu (AIST), Dr. Yasuhisa Yamamura (Univ. Tsukuba), and Dr. Harumi Yokokawa (AIST).

The Symposium invited active researchers ranging from theoreticians to experimentalists, in the field ranging from condensed matter physics to biothermodynamics. In total, 95 delegates (including 11 from overseas) attended the symposium and 64 papers were presented orally and/or by posters. This special issue of the *Journal of Thermal Analysis and Calorimetry* contains 24 selected papers, which were reviewed by two independent referees.

The Symposium was opened by the symposium chair, Professor Tooru Atake. The following keynote address was given by a distinguished guest, Professor Hiroo Inokuchi (Professor Emeritus, The University of Tokyo, currently at National Space Development Agency of Japan). In total 16 plenary lectures were as follows: 1) Mirosław S. Gruskiewicz (Oak Ridge National Laboratory, USA) 'Water Adsorption at Temperature to 250°C as a Tool for Characterization of Porous Solids', 2) Joseph W. Magee (NIST at Boulder, USA) 'Physicochemical Characteristics of Room Temperature Molten Salts', 3) Yoshikata Koga (University of British Columbia, Canada) 'Femtosecond Pump Probe Spectroscopy or Calorimetry? The Effects of Some Salts on H<sub>2</sub>O: Towards Understanding the Hofmeister Series', 4) Brian F. Woodfield (Brigham Young University, USA) 'The Effect of Particle Size on the Heat Capacity of TiO<sub>2</sub> Nanoparticles', 5) Kazuo Kitahara (International Christian University, Japan) 'On Statistical Mechanical Foundation of Nonequilibrium Thermodynamics', 6) Norman E. Phillips (University of California, Berkeley, USA) 'The Heat Capacities of Two Unusual Superconductors, MgB<sub>2</sub> and 1.3H<sub>2</sub>O', 7) Alain Junod (University of Geneva, Switzerland) 'Heat Capacity at High Magnetic Fields and High Pressure for Unconventional Superconductors', 8) Frederick P. Schwarz (NIST at Gaithersburg, USA) 'Thermodynamics of DNA Conformations and Interactions in Transcription', 9) Akinori Sarai (Kyushu Institute of Technology, Japan) 'Thermodynamic Database for Proteins', 10) Toshimasa Hashimoto (TIT, Japan) 'Temperature Wave Analysis for Thermal Diffusivity Measurement', 11) Yasuhisa Nagano (Osaka University, Japan) 'Micro-Combustion Calorimetry for Materials Science', 12) Hideo Ogawa (Tokyo Denki University, Japan) 'Development and Application of a High Temperature and High Pressure Flow Calorimeter for Enthalpy of Mixing', 13) Nobuyoshi Koga (Hiroshima University, Japan) 'Significance of Reaction Rate Control on the Thermal Decomposition of Solids', 14) Takuya Hashimoto (Nihon University, Japan) 'Investigation of New Phase in Functional Oxide Materials by Thermal Analyses', 15) Shinnya Honda (AIST, Japan) 'Stability and Folding Cooperativity of a Designed Miniature

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Protein, Chignolin', 16) Osamu Yamamuro (The University of Tokyo, Japan) 'Dynamics of Supercooled and Glassy Water Studied by Neutron Scattering'.

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