

## *Preface*

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This Special Issue of *Journal of Thermal Analysis* is intended to illustrate examples of recent advances in applications of thermal analysis (TA) methods to food (and food-related) materials and systems.

The common focus of all the papers in this Special Issue is on the application of TA to study food (and related) materials, products, and processes. As Guest Editors, we made a deliberate effort to invite contributions from recognized experts in the field of food science and technology, as well as in the related fields of pharmaceuticals and biologicals. These contributors are not necessarily recognized as experts in TA theory and practice, *per se*; rather, they typically use TA as an important diagnostic tool to help increase understanding, answer questions, and solve problems. As many of the papers in this Issue demonstrate, such workers often use TA (i.e. DSC, DMTA, TMA, MDSC, isothermal microcalorimetry, etc.) as just one among various other problem-solving tools (e.g. X-ray diffraction, NMR, rheometry, mechanical spectrometry, ESR, dielectric spectroscopy). This use of a multi-technique approach to studies of food systems constitutes an increasingly popular trend in the food science field in recent years [1]. Nevertheless, as exemplified by the collection of papers in this Issue, DSC remains, by far, the most common and popular TA method used, either alone or in combination with other TA or non-TA techniques, for such studies. In all such work, the main interest and fascination is with the food system under study, rather than with the particular TA methods used to study it.

The central theme of the contents of the papers in this Special Issue is recent advances; in other words, what's new in the food science and technology field; what are some of the current issues that TA is being utilized to explore? As Guest Editors, we deliberately left the choice of subject matter for these contributed research papers up to the invited senior authors. Most of the papers in this Issue deal with applications of TA methods to study glass transitions and/or crystallization processes in amorphous or partially crystalline food (and related) systems. Such systems exist far from equilibrium, and investigations of their kinetics (as related to, e.g., processing operations and storage stability), rather than energetics, using approaches borrowed from the fields of synthetic polymers and materials sciences, frequently make use of DSC and/or other TA methods [1]. A number of papers in this Issue deal with the thermal or thermomechanical properties and behavior of common food polymers such as starch (gelatinization, retrogradation) and gluten, in either simple model systems or actual cereal-based products, such as baked goods and related systems, including breads, cookies, crackers and their respective doughs, as well as breakfast cereal products. In studies of such food systems (and of related plant materials), the plasticizing effect of water on  $T_g$ , as visualized through the use of state diagrams, is a popular topic of discussion [1]. Various thermal properties of other food polysaccharides and proteins (as well as protein drugs) are dealt with in several papers, as are also the crystallization behavior of fats and

of amorphous sugars; structural aspects and stability are subjects of focus here; chemical reactions and ingredient interactions are also not neglected. In the papers collected here, the TA methods employed include DSC, DMA, DMTA, TMA, TSC, isothermal calorimetry and microcalorimetry, and (not to be left out of an issue covering 'Recent Advances...') the new technique of Modulated DSC. As we have tried to indicate above, the subject matter of this Special Issue is, by design, quite diverse and, hopefully, will be of broad interest to the readers of Journal of Thermal Analysis.

As Guest Editors of this Special Issue, we wish to thank all the senior authors who accepted our invitation to contribute papers, diligently fulfilled their commitment, and cooperated in bringing to fruition this 2+ years-long publishing project. We especially wish to acknowledge and thank the 57 referees (see following list) of the 27 papers in this Issue, who selflessly contributed to the success of this project by significantly enhancing the scientific quality of the invited papers. Were it not for traditional restrictions concerning confidentiality, we would have liked to identify the specific referees of each paper, so that the authors would know whom to thank for their valuable efforts.

Last but not least, we reserve our most special thanks for Dr. Edith Turi, Regional Editor of Journal of Thermal Analysis, who came up with the idea of having this Special Issue. Dr. Turi felt that there was a need for it, and that J. Thermal Anal. would do a great service to the scientific community by publishing such a Special Issue. It was Edith who chose Louise Slade and I to become Guest Editors of this Issue and who invited us to do so, and it was also Edith who shared with us her editorial experience about how J. Thermal Anal. handles manuscripts and Special Issues. Were it not for Edith Turi's initiative and contributions to its preparation, this Special Issue of Journal of Thermal Analysis would not exist.

## Reference

- 1 L. Slade and H. Levine, *Adv. Food Nutr. Res.*, 38 (1995) 103.



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