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Preface

In the past decade, the study of amphiphilic association structures has developed into one of the most important areas of research in colloid chemistry.
The very large number of self-assemblies of monomeric amphiphiles and of polymeric (macromolecular) molecules have opened up a world of opportunities.
The fast-growing research is due to two main factors: the development of statistical, mechanical and dynamic theories of model amphiphilic systems, and the development of new analytical techniques to explore the microstructures of these complex systems.
The new techniques include small-angle X-ray diffraction (SAXS), small-angle neutron diffraction (SANS), self-diffusion NMR (SDNMR), CryoTEM, time-domain dielectric spectroscopy (TDS) and others.
The thermal behavior of self-assemblies in aqueous and organic systems is an important physical property, both from the industrial point of view and from analytical and structural aspects.
Many studies have been conducted to investigate the nature of 'water' in dispersed systems (emulsions, microemulsions and double emulsions), in order to better understand both the structure and the mechanism of release of addenda from liquid entrapment.
This Special Issue of the Journal of Thermal Analysis and Calorimetry presents the first review articles on the use of thermal analysis to study the microstructures and physical properties of dispersed systems.
We hope that the reviews will provide a good update on the important area of organized solutions.
The issue contains review articles on aqueous binary phases consisting of micellar solutions which characterize structural changes resulting from different types of micellar interactions between micelle-forming and bilayer-forming amphiphiles.
More sophisticated structures consisting of amphiphiles, water and oil, such as microemulsions and macroemulsions, are also discussed in terms of the behavior of water in nonionic microemulsions (free and bound water), and in terms of the structural transitions occurring in the microstructures of the microemulsions. Thermodynamic properties of microemulsions have been reviewed on the basis of investigations of phase equilibria by calorimetry.
The percolation phenomenon in microemulsions is an important transport mechanism. DSC measurements are a good tool for the study of percolation. A special review is devoted to this subject.
Large, non-thermodynamically stable, dispersed macroemulsion droplets have been studied by steady cooling processes, using the DSC method to describe some stability and mass transfer implications.
Nanoparticles prepared by microemulsion techniques are of significant industrial importance. Calorimetric investigations are discussed as important tools for establishing the size and the shape of the particles.

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In one of the articles, liquid crystalline phases are reviewed and compared with other self-assemblies.
Some biological assemblies, such as structural forms in phospholidyl glycerol and liposomes, are also discussed.
In addition, more specific applications of DSC in other areas are discussed and presented as examples of the diversity and options available to scientists using these techniques.
We hope that the reader will find this Special Issue of interest, and that it will be informative and educative to those involved in this area of colloid chemistry.

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Guest Editor

Nissim Garti is a Full Professor and the Head of the Casali Institute of Applied Chemistry, Graduate School of Applied Science, The Hebrew University (HU) of Jerusalem, Israel. Prof. Garti is also the Head of the Israeli Association of Surface and Colloid Chemistry. He served as Director of the Graduate School of Applied Science and was a member of numerous committees at the HU and the Israel Ministry of Science.
His areas of interest are: emulsions, double-emulsions, microemulsions, organized solutions, crystallization phenomena at interfaces, and chemistry of amphiphiles.