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Preface

The publication of another special issue on temperature-modulated calorimetry (TMC) was decided upon during the preparatory work and organisation of the "6th Lähnwitzseminar on Calorimetry" in June 2000 in Kühlungsborn (Germany). There were 46 attendees from 14 countries in America, Asia and Europe. All contributions to this special issue were presented at this workshop as a lecture or a poster.

The main issue of this meeting was an almost open-end discussion on the measurement and interpretation of frequency and time dependent heat capacities. While the quantitative analysis of the classical static (time-independent) heat capacity was previously in the foreground, in recent years questions about the time dependence of heat capacity have moved increasingly into the focus of scientific interest. To the former belongs the technique known as classical AC calorimetry, in particular as developed by Sullivan and Seidel, which is nowadays also used to study the frequency dependence of the heat capacity. The combination of periodic temperature perturbations and differential scanning calorimetry by Gobrecht in 1971 yielded the first direct measurements of complex heat capacity. The technique, today known as the 3ω method, was first used for the quantitative analysis of the heat capacity of thin wires, which was assumed to be time-independent. The investigations of Birge and Nagel in the glass transition range of amorphous systems opened up the field of heat capacity spectroscopy of time-dependent phenomena in a rather wide frequency range. In addition to these techniques, where a heater is driven with periodically-oscillating electrical power and the resultant temperature change is evaluated, alternative techniques were developed. Calorimeters where the temperature change of the sample is due to light absorption can be mentioned here. The temperature drift of an adiabatic calorimeter was used by Suga to study time-dependent heat capacities in the vicinity of the glass transition.

The possibilities and limits of these methods are clear now and we hope that this special issue will contribute to the distribution of this knowledge within the scientific community. As can be seen from the contributions, glass transition and melting of polymers seems to be the most exciting phenomena studied by heat capacity spectroscopy.

Finally, we would like to thank all of the authors who have contributed to this issue, as well as the referees who carefully checked the papers and helped us considerably — not only to get this issue together in time but also to obtain a rather high scientific level. Our thanks also go for the publisher, Elsevier Science, in particular to S. Go who initiated this special issue on the proceedings of the 6th Lähnwitzseminar on Calorimetry and encouraged us considerably.

Christoph Schick
Günther W.H. Höhne

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