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Thermochimica Acta 295 (1997) ix

thermochimica acta

Preface

The versatility of thermal-analysis methods is proven by the steadily increasing flood of literature published since the early seventies. The specific analytical information obtained from individual methods is, however, limited, and from the early beginning of widespread application, the combination of methods was practised. The lasting success of simultaneous TG–DTA ('STA') demonstrates the power of additional information gained through hypenated techniques. Also, in the early stages, the combination with gas-analysis methods was attempted with primarily home-made-coupling systems.

The special issue of *Thermochimca Acta* is to provide a survey of the present state of instrumentation and the main application areas of coupled thermal-analysis and gas-analysis methods. Setting this as a goal, it was clear that only a small selection of the many possible methods of gas analysis, and of thermal analysis as well, could be handled.

The first review article of Raemaekers and Bart shows, in a broad literature survey, the numerous attempts at combining methods in the past. The limitation of further contributions to TG–MS, TG–FTIR and TG–GC–MS demonstrates the success of these method combinations introduced. Theoretical considerations of mechanisms for inert-gas release from solids are covered by Balek and Beckman and the relations between evolution of gas and detected signal are mathematically described by Roduit et al. From the more practical point of view, general features of coupling systems are discussed by myself and the important question of quantitative work and calibration in coupled instruments is well described by Maciejewski and Baiker. The broad scope of application areas we had planned to cover in this special issue could not be fulfilled. However, the contributions submitted open a window to many similar application areas.

As with thermal analysis in general, polymer applications are also dominant with the hyphenated techniques, especially TG–MS and TG–FTIR. This is shown in the articles of Reggers et al. and of Raemaekers and Bart. Of special importance for combined methods is the field of environmental research and waste management. Pre-separation of the complex mixtures of evolved gases by GC may be a necessity (Reggers et al.) and the inhomogeneity of the sample materials make the up-scaling to Macro STA systems, as described by Kettrup et al., indispensable. The strength of the combined methods in high-temperature applications and materials development is well covered by the contribution of Leitner and Jaenicke–Rößler, and a new outlook for better description of solid–gas reactions is demonstrated by Maciejewski et al., with the unique pulse thermal analysis technique for coupled TG–MS.

To all authors, who took the time to prepare an article on top of their daily work load, I express my sincere gratitude. The acceptance and success of this special issue will be the reward for these tremendous efforts. Cordial thanks also go to all my co-workers and colleagues who did important work in the background and, last but not the least, to the editors of *Thermochimica Acta*.

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