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Editorial

Special issue—Pharmaceutical applications of modulated temperature calorimetric techniques

When modulated temperature DSC (MTDSC) was introduced in the early 1990s, the technique attracted great interest within the thermal analysis field, particularly for the characterisation of amorphous polymers. This coincided with a growing recognition within the pharmaceutical sciences that our understanding of the fundamental behaviour of the glassy state was not as well developed as might be desirable. Following a series of papers by groups such as those of Zografi and Pikal, issues such as the generation of partially amorphous drugs, plasticization by sorbed water, recrystallisation in relation to storage temperature and collapse of freeze dried systems have become much more widely recognized as being of great importance. In particular, the idea that fundamental understanding of the amorphous state may lead to greater control has gained currency. Consequently, the introduction of MTDSC appears to have come at a fortuitous time and indeed it is precisely the issues outlined above that have been the focus of much of the activity utilizing the technique within the pharmaceutical field. While work is ongoing with regard to the use of the approach for assessing melting and crystallisation behaviour, it is for the characterisation of amorphous materials that the method is most well established. The ability to separate the glass transition from other accompanying thermal events and to detect small heat capacity changes with greater sensitivity than is possible using conventional DSC are in themselves significant benefits. These advantages have resulted in many workers in both academia and industry exploring the applications of the technique for amorphous pharmaceuticals.

This special issue arose as a result of a symposium held at The School of Pharmacy, University of London, in September 1998 (1st International Symposium of Pharmaceutical and Food Science Applications of MTDSC). The meeting was instigated in order to bring together thermal analysts and applied scientists working in the MTDSC field with a view to exploring how the technique could be applied within the pharmaceutical and food sciences. It soon became apparent that the symposium was providing a potentially highly valuable knowledge base which could be of relevance to both existing and new users of the technique, hence each speaker was invited to submit contributions which have been assembled here to form this issue. The papers have been ordered so as to fall into three categories. Firstly, the basic principles of the technique are outlined, with special emphasis on issues such as calibration which require particular attention when performing MTDSC studies. Secondly, a range of applications are outlined, including wholly and partially amorphous drugs and foods. Finally, two papers on the novel related technique of microthermal analysis are included. This method is attracting considerable interest within both the thermal and

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pharmaceutical fields and, given that it represents a development of the modulated technique (and was introduced by the same group), its inclusion here was considered appropriate.

One significant problem that has arisen with regard to the modulated technique, which has yet to be fully resolved, is that of nomenclature. When the method was first introduced by Reading in the early 1990s, the term modulated DSC was initially used. As the number of techniques based on the principle of a superimposed modulation grew, it became necessary to use a more generic term, hence modulated temperature DSC was adopted. Over the last 12 months, however, there has been a growing call from some quarters to use the term Temperature Modulated DSC (TMDSC). At the time of writing, ICTAC have recommended the MTDSC expression (with the suggestion of using the abbreviation in the form mtDSC) although this has not yet been formally ratified and is still open to comment. However, in anticipation of such confirmation we have favored the MTDSC term in this series of papers.

Finally, it only remains for me to thank the speakers of the symposium for both their participation in the meeting and their cooperation in submitting papers for this special issue. I would also like to thank those who attended the meeting and made it such a successful and enjoyable event.

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