Temperature Modulated DSC: Recommendations for good Practice and Selected Examples

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Temperature Modulated DSC (TMDSC) is now recognized as a very powerful technique in pharmaceutical and food applications to determine purity or crystalline forms, or to localize glass transitions. The technique has however been intensively used to investigate polymers. In this context advices and recommendations are necessary to take full advantage of this technique.

Essential features have to be considered: *i)* calibration in term of heat capacity, through the heat capacity calibration constant K_{Cp}, to unambiguously determine the contribution of reversing and non-reversing heat flows; *ii)* assessment of experimental parameters in terms of temperature modulation amplitude $A_{T,}$ the modulation frequency ω and the corresponding period p; clearly these three parameters cannot be selected independently; *iii)* estimation of the possible temperature-dependent asymmetry (or the thermal imbalance between measuring and reference cells) resulting from the measuring cell itself and its content (the sample under investigation).

The importance of the above initial checks will be stressed then, some selected examples will illustrate the undisputable advantages in using TMDSC to investigate polymers and multicomponent mixtures (polymer resins) in polymer science, with special applications in elastomer characterisation and microelectronics.

References

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