

The Importance of Accurate Heat Capacity Measurements in Modulated Temperature DSC

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Abstract

Modulated Temperature DSC is based on the assumption that the amplitude of the modulation can provide an accurate measurement of the heat capacity. This is normally true to a reasonable approximation because the majority of baseline curvature normally found in the conventional a DSC measurement is not found in the cyclic signal. However, a reliable measurement of heat cyclic (or complex) heat capacity requires calibration as a function of temperature, and baseline subtraction. There is also the complication that at shorter periods it exhibits a substantial frequency dependence. Furthermore, for maximum benefit from MTDSC it is preferable that the underlying signal is also calibrated so that accurate heat capacities can be determined in order that comparisons between the cyclic and underlying measurements can be made with confidence. While this can be achieved in practice it is only with significant time and effort.

A new approach to MTDSC measurements now makes possible the routine determination of accurate heat capacities for both the underlying and cyclic signals. This greatly simplifies the task of obtaining high quality data that can be interpreted with greater confidence. This adds further value to the use of modulation in DSC.