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Determination of Glass Transition Temperature and Specific Heat of Moist Samples using TMDSC

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In differential scanning calorimetry (DSC), remnant moisture loss in samples often overlaps and distorts other thermal events such as e.g. glass transitions. To separate such overlapping processes temperature-modulated DSC (TMDSC) has been widely used [1 - 7]. In this contribution we discuss the quantitative determination of the heat capacity of a sample with moisture from TMDSC-measurements. The sample was a spray dried pharmaceutical compound run in different pans (hermetically sealed pan, 50 μ m pierced lid pan and open pan). The apparent heat capacity was corrected for the remaining amount of moisture (Fig. 1). Using this procedure we could clearly identify the glass transition of the dry and the moist sample. We found that a moisture content of about 5.4 % shifts the glass transition temperature by about 50 °C.

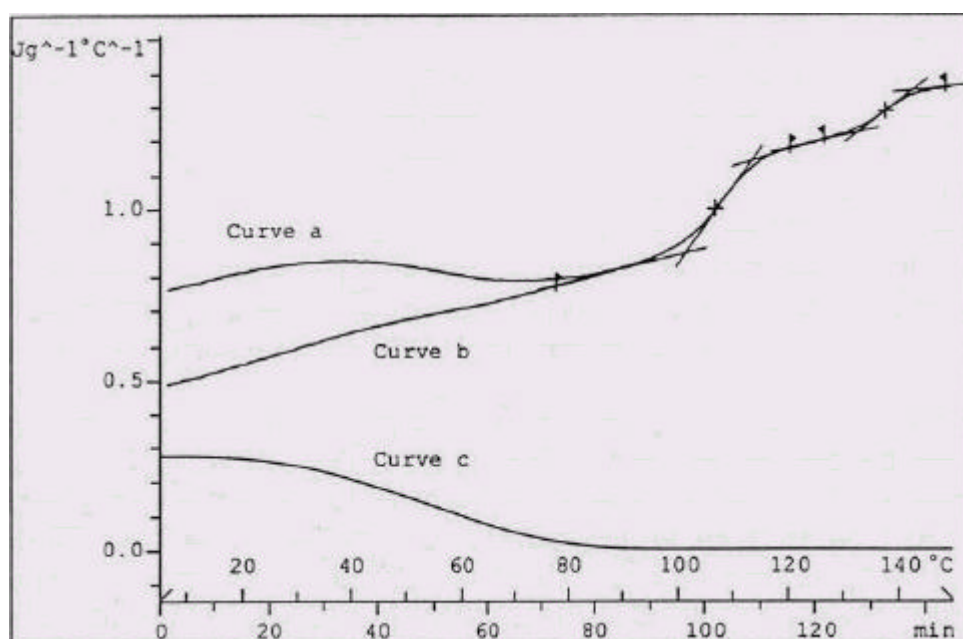


Fig. 1: Correction of the apparent heat capacity by the heat capacity contribution due to the loss of moisture (curve a: apparent heat capacity, curve b: apparent heat capacity corrected by the amount of evaporated water (curve c).

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