

Resolution of Differential Scanning Calorimeters

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The definitions of the temperature resolution, the so-called resolution of DSC instruments given in literature are discussed [1]. A new definition of the resolution for DSC instruments is presented and outlined. The main characteristic introduced in this new definition is a minimum between two caloric events as a prerequisite of an existing resolution. Existing reference substances and possible candidates of test substances have been evaluated and their usefulness discussed [1,2,3]. The oligomer n-hexatriacontane is revealing an interesting phenomenon, namely a lambda transition which is in the peak temperature only 2 K lower than the melting temperature of 76 °C. The substance was selected as an ideal test substance for the quantification of the resolution of DSC instruments. The lambda transition is a second order process which may reach under certain conditions the saturation of the occurring molecular dislocation within a half width of 0.2 K, and after saturation the heat flow rate drops sharply down [4].

Investigations concerning the main characteristics of n-hexatriacontane in respect to the temperatures of transition (lambda transition and melting), to the involved enthalpies, and to the resolution factors were performed as functions of the sample mass and the heating rate.

The importance of relevant evaluation procedures increasing the resolution factors of DSC curves are discussed and these procedures are integrated into the testing of the resolution [5]. The necessity for widening the experimental scope from instruments to evaluation procedures is forced by the existence of instruments with built-in signal treatments based on electronic devices and software procedures [6]. A comparison with literature data is outlined for all of the mentioned characteristic values of n-hexatriacontane

References

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