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Application of fast scanning calorimetry to the fusion thermochemistry of low-molecular-weight organic compounds: fast-crystallizing *m*-terphenyl heat capacities in a deeply supercooled liquid state

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Highlights

- Heat capacities of three organic compounds were measured by fast scanning calorimetry
- Supercooled liquid *m*-terphenyl molar heat capacity was obtained the first time.
- Fast scanning calorimetry results are confirmed by solution calorimetry.
- Heat capacities of studied supercooled liquids are linear functions of temperature.

Abstract

Fusion enthalpy temperature dependence is related to the difference in heat capacity of the liquid and solid. Below the melting temperature, it is hard to measure the liquid heat capacity using conventional methods due to fast crystallization.

Based on an indirect solution calorimetry approach, we previously concluded that the temperature dependence of heat capacities below the melting temperature is the extrapolation of the linear function above it. In this study, we employed a fast scanning calorimetry technique to test the validity of this conclusion.

Three compounds were studied: two organic glass formers, benzophenone and *o*-terphenyl, for which the liquid and supercooled liquid heat capacities were known to be accurately described by a linear function of temperature, and *m*-terphenyl, which had never been studied in the supercooled liquid state. The results were in good agreement with the literature for liquid

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