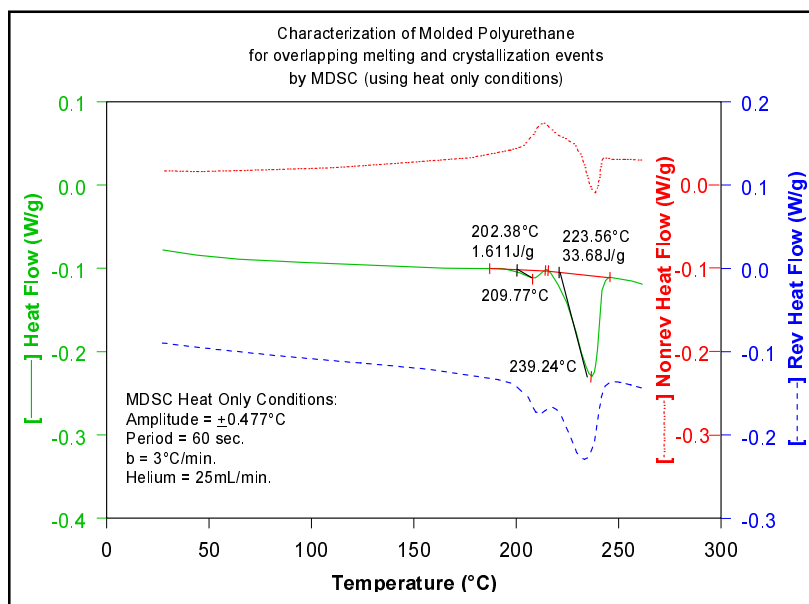


THERMAL SOLUTIONS

Characterization of Polyurethane by MDSC[®]



DSC measures the temperatures and heat flows associated with transitions in materials as a function of temperature or time in a controlled atmosphere. Modulated DSC[®] (MDSC) is an enhancement to conventional DSC whereby the total heat flow is separated into reversing (heat capacity) and non-reversing (kinetic) components. The reversing signal contains heat capacity events such as the glass transition and melting. The non-reversing signal contains kinetic events such as crystallization, crystal perfection and reorganization, cure, and decomposition.

The above figure shows an MDSC experiment run on a sample of molded polyurethane. The middle curve shows what appears to be two melting endotherms in the total heat flow curve (same as standard DSC). The user suspected, but could not confirm by standard DSC, that crystallization (reordering) was occurring simultaneously in the melt region. Using MDSC with heat only conditions (no induced cooling) crystallization is easily detected in the non-reversing signal at the same time as melting is evident in the reversing curve. This example clearly shows the utility of MDSC to accurately characterize materials with overlapping thermal events.

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