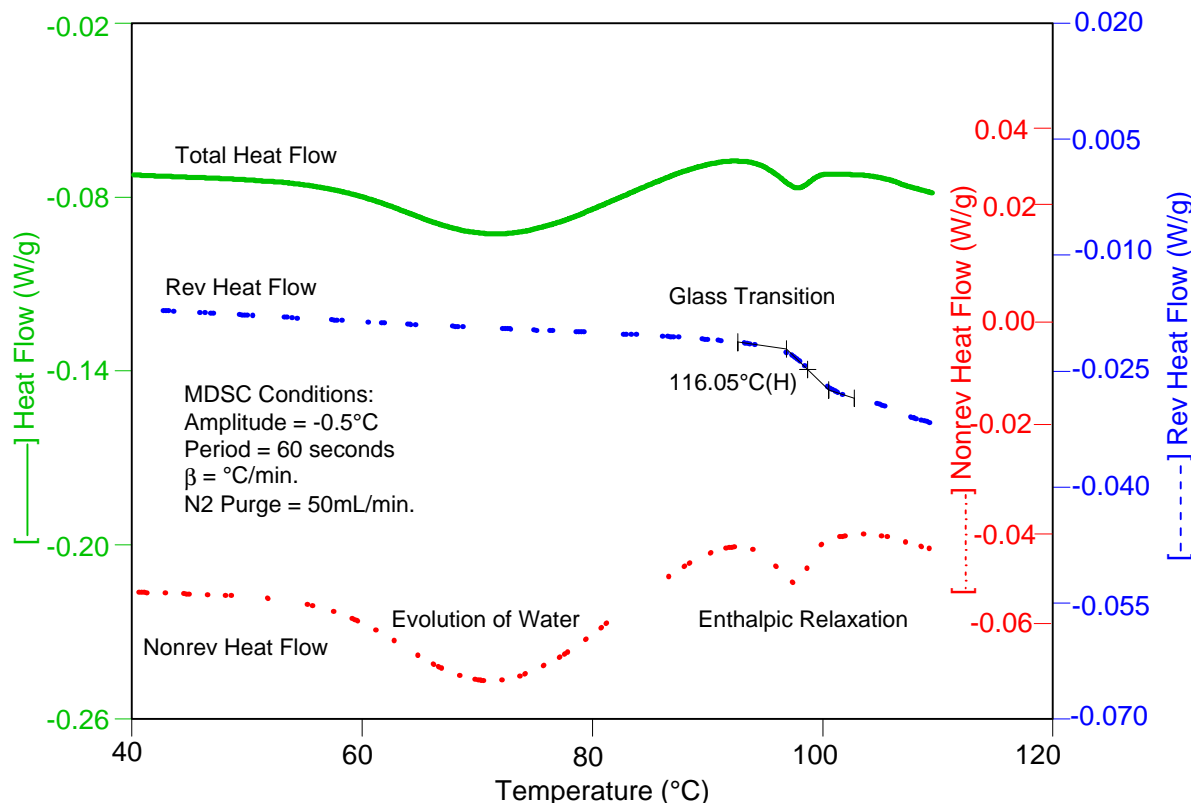


## THERMAL SOLUTIONS

### Characterization of the Glass Transition Temperature of Lactose 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. MDSC is an enhancement to conventional DSC in which 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.

Determination of the glass transition temperature of Lactose can be difficult in a single run by standard DSC. Often the event is masked by the evolution of water and enthalpic relaxation. A second run by standard DSC is often required to clearly detect the glass transition temperature. MDSC can be used to make this analysis in one experiment. The above plot shows an MDSC experiment on a sample of Lactose. Note how the glass transition is clearly resolved in the reversing heat flow signal. Because the evolution of water and the enthalpic relaxation are kinetic phenomena, these events are separated into the non-reversing heat flow signal. This example clearly demonstrates the advantage MDSC has over standard DSC in characterizing material properties, often in one experiment.