

APPLICATION SHEET

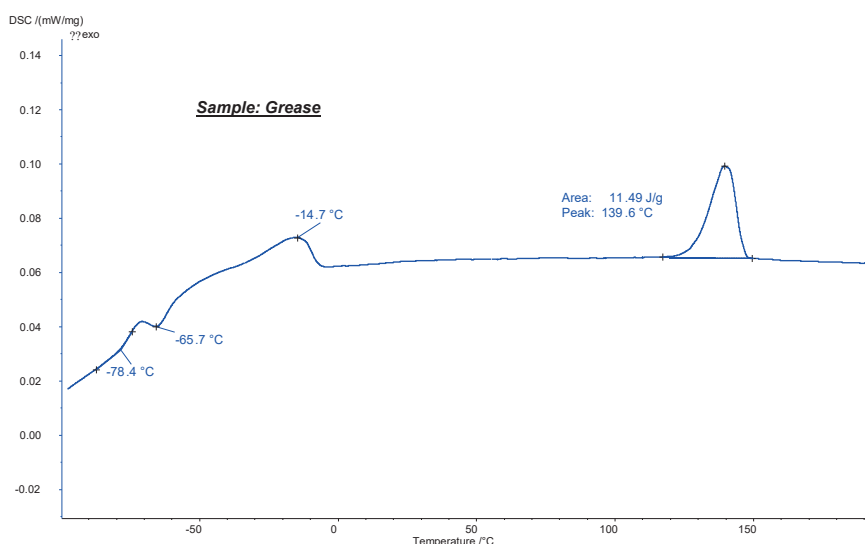
Lubricants · Polymer Manufacturing
DSC 204

Grease

Introduction

Although the word grease originally described the rendered fat of animals, the term is now applied more broadly for a lubricant of higher initial viscosity than oil, consisting originally of a calcium, sodium or lithium soap jelly

emulsified with mineral oil. The glass transition of greases can be determined employing the DSC method. Especially modulated DSC can be an ideal tool for separating the various overlapping effects occurring during heating of the material.



Test Conditions

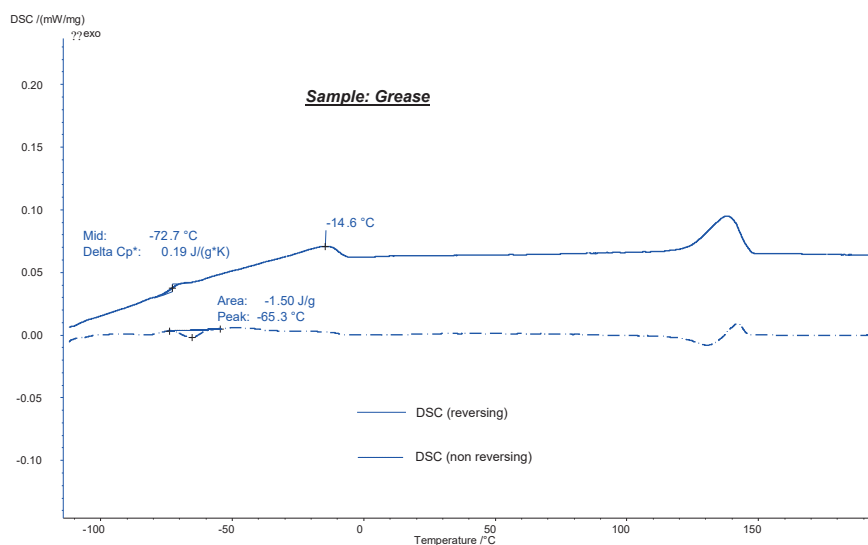
| | |
|------------------------|-----------------------|
| Temperature range: | -120 ... 200°C |
| Heating/cooling rates: | 2 K/min |
| Atmosphere: | Nitrogen at 20 ml/min |
| Sample mass: | 8.92 mg |
| Crucible: | Al, pierced lid |

Test Results

In the measurement without modulation, the change in specific heat detected at -78°C (onset temperature) is due to the glass transition of the grease. It cannot be evaluated because it is overlapped with an exothermal peak at -65.7°C (peak temperature) that probably results from crystallization. Two melting effects were measured at -14.7% and 139.6°C (peak temperatures).

APPLICATION SHEET

Lubricants · Polymer Manufacturing
DSC 204



Test Conditions for Modulated DSC Measurements

Temperature range: -120 ... 200 °C
Heating/cooling rates: 2 K/min
Amplitude: ± 0.5 K
Period: 90 s
Atmosphere: Nitrogen at 20 ml/min
Sample mass: 8.92 mg
Crucible: Al, pierced lid

Test Results

Accurate evaluation of the glass transition and crystallization peak is possible with modulated measurements because they allow separation of the reversing and non-reversing signal whereas the crystallization peak occurred in the non-reversing signal. Both effects can now be accurately evaluated. The glass transition was determined at -72.7 °C (midpoint) with a change in specific heat of 0.19 J/(g·K) and the crystallization peak is related to an enthalpy of 1.50 J/g.