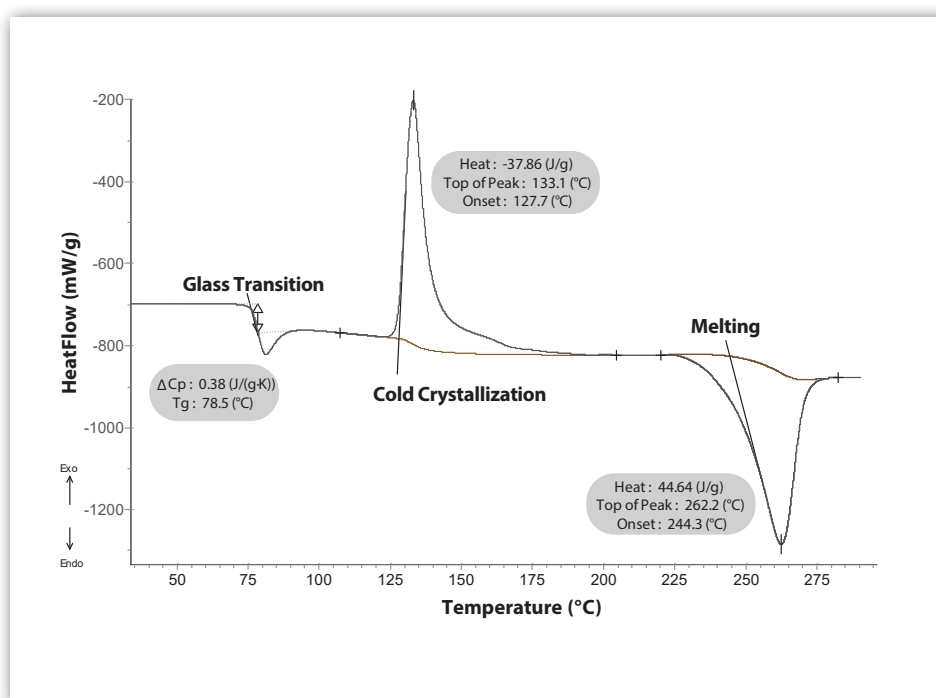


Determination of Crystallinity of PET by DSC

INTRODUCTION

PolyEthylene Terephthalate (PET) is a polyester widely employed in daily life (e.g. in water bottles, textile fibers, credit cards). The crystallinity is a very important characteristic because it is directly related to the properties of the polymer (e.g. toughness, clarity, stability). It is defined as the ratio between the crystalline and amorphous phases in the polymer. DSC is one of the main analytical techniques to determine the crystallinity ratio in a semicrystalline polymer.



EXPERIMENT

Sample:

PolyEthylene Terephthalate (PET) pellet

Experimental conditions:

- Atmosphere: Nitrogen, atmospheric pressure
- Sample mass: About 25 mg in a 100 μ l aluminium crucible

Experimental procedure:

The temperature is programmed from 35°C up to 300°C at 10 °C.min⁻¹

RESULTS AND CONCLUSION

The DSC heating curve of the PET presents three main events:

- A glass transition that characterizes the initial amorphous phase of PET
- An exotherm that corresponds to the crystallization of the amorphous phase, also called cold crystallization
- An endotherm that corresponds to the melting of the initial crystalline phase and also to the melting of the crystalline form, coming from the cold crystallization. PET Crystallinity is measured according to the following equation:

$$\%Cryst = ((|\Delta H_m| - |\Delta H_c|) / \Delta H_m^0) \times 100$$

with:

- ΔH_m heat of PET melting
- ΔH_c heat of PET cold crystallization
- ΔH_m^0 heat of melting (100% crystalline PET) (140.1 J/g).

Crystallinity in this case : 4.8 %

INSTRUMENT

SETLINE DSC / DSC+

-170 to 700°C



EASY TO USE WITH ROBUST SENSOR TECHNOLOGY
ensuring quality, consistent and reliable data

AVAILABLE WITH HIGH PRESSURE CRUCIBLES
up to 500 bar at 600°C

REASONABLY PRICED INSTRUMENT & SENSOR
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through simplified maintenance and a Replacement Parts
Guarantee

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for fast expert help with any questions

CALISTO 2.0 EXCLUSIVE SOFTWARE
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