

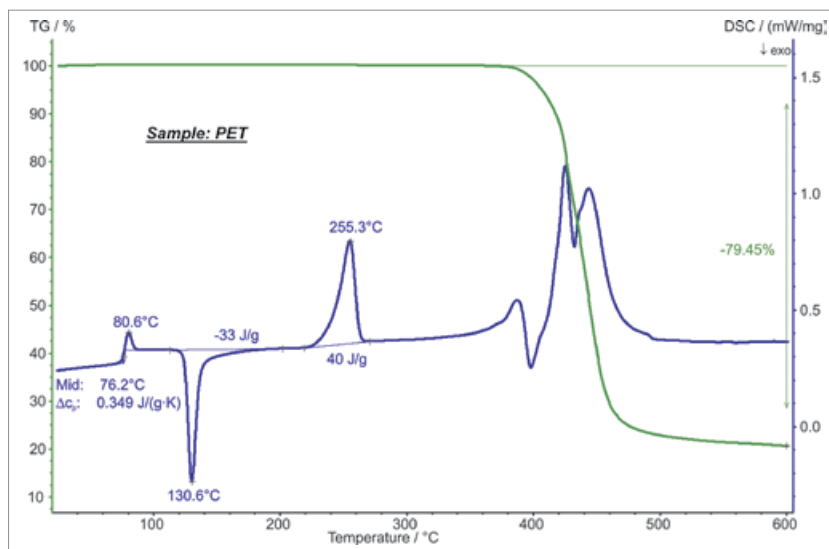
APPLICATION SHEET

POLYMERS – POLYMER MANUFACTURING

POLYETHYLENE TEREPHTHALATE (PET)

Polyethylene terephthalate (PET) is a thermoplastic polymer of the polyester family. Depending on its thermal history, it may exist both as amorphous (transparent) and as semi-crystalline (opaque and white) material. PET can be semi-rigid to rigid, depending on its thickness, and is very lightweight. Plastic bottles, textile fibers and foils (for example packag-

ing for food) are well-known applications of PET. Even a single-way PET bottle is nowadays considered to be very eco-friendly because the production requires relatively low temperatures and the recycling or combustion is uncritical. Due to its low weight, the transport of PET bottles requires furthermore less fuel compared to classical glass bottles.



Instrument

STA 449 **F1** Jupiter®

Test Conditions

Temperature range	RT ... 800°C
Heating/cooling rates	10 K/min
Atmosphere	N ₂ (70 ml/min)
Sample mass	10.13 mg
Crucible	Pt
Sensor	TG-DSC type S

Results

The STA measurement exhibits a step in the DSC signal at 76°C which is due to the glass transition. A corresponding increase in specific heat of 0.35 J/(g·K) was detected. The endothermic DSC peak at 81°C is due to relaxation, the exothermic peak at 131°C is due to cold crystallization and the endothermic peak at 255°C is due to melting. From the lower enthalpy of crystallization compared to the melting enthalpy, it can be concluded that the sample was initially partially crystalline. At temperatures above 360°C, the pyrolytic decomposition of the sample occurred with an entire mass loss of 79.5%. At 600°C, significant amounts of carbon black (pyrolysis product) are left.