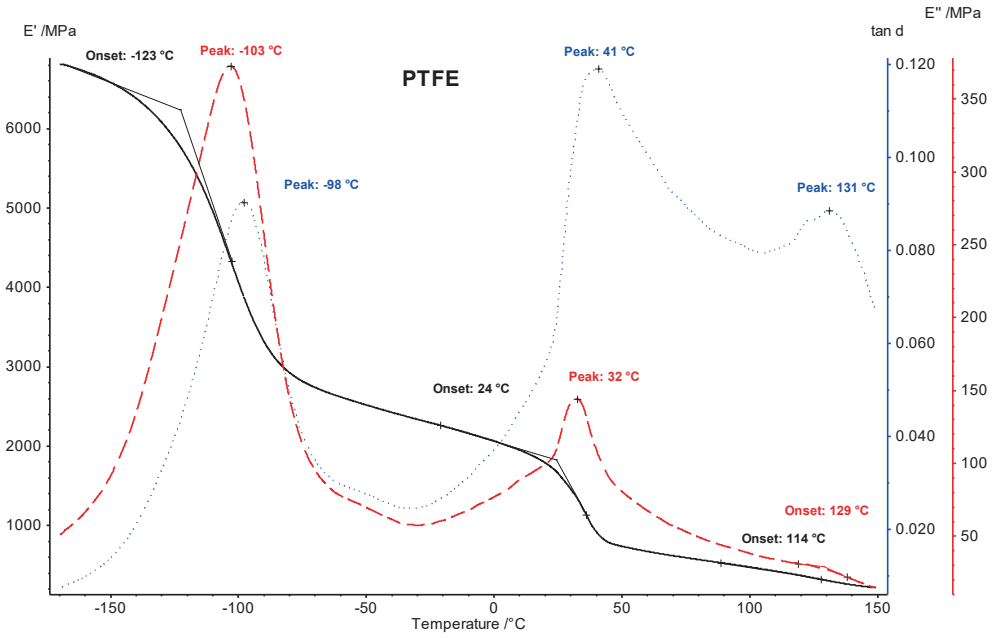
APPLICATION**SHEET**

Polymers · Polymer Manufacturing
DMA 242 E *Artemis*

PTFE (Polytetrafluoroethylene)

Introduction

PTFE – commonly known by its DuPont brand name Teflon – is a widely used material due to several extraordinary properties. As it is inert with most chemicals – including all acids and bases – one of its uses is the coating of corrosives containers. Since PTFE also has the lowest friction of any known solid, it is also being used in many mechanical applications involving sliding action and as a non-stick coating, not only for cookware. PTFE can be used over a wide temperature range from -200°C up to approx. 260°C, at which point its properties significantly deteriorate. It decomposes at approx. 350°C. Due to its use in composite materials exposed to great changes in temperature, exact knowledge of its thermal properties is vitally important.



Test Conditions

Temperature range:	-170°C ... 150°C
Heating/cooling rates:	2 K/min
Sample holder:	3-point bending, 40 mm
Amplitude:	± 60 µm
Frequency:	1 Hz
Proportional factor:	1.2
Max dynamic force:	4 N

Test Results

Presented in the plot is the storage modulus E´ (black curve), loss modulus E" (red curve) and loss factor tan δ (blue curve). A β-transition was detected at -123°C (extrapolated onset) for the storage modulus. The corresponding peak in the E" curve was at -103°C and at -98°C in the tan δ curve. At 24°C, a crystal-to-condis-crystal transition was measured. The related peaks in the E" and tan δ curve were found at 32°C and 41°C, respectively. The glass transition was observed at 114°C. The same effect can be evaluated as a shoulder in the loss-modulus curve at 129°C or as a peak in the tan δ curve at 131°C. DMA detects these transitions with much higher sensitivity and reproducibility compared to DSC or TMA

NGB · Application Sheet 096 · E · 0621 · Technical specifications are subject to change.

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