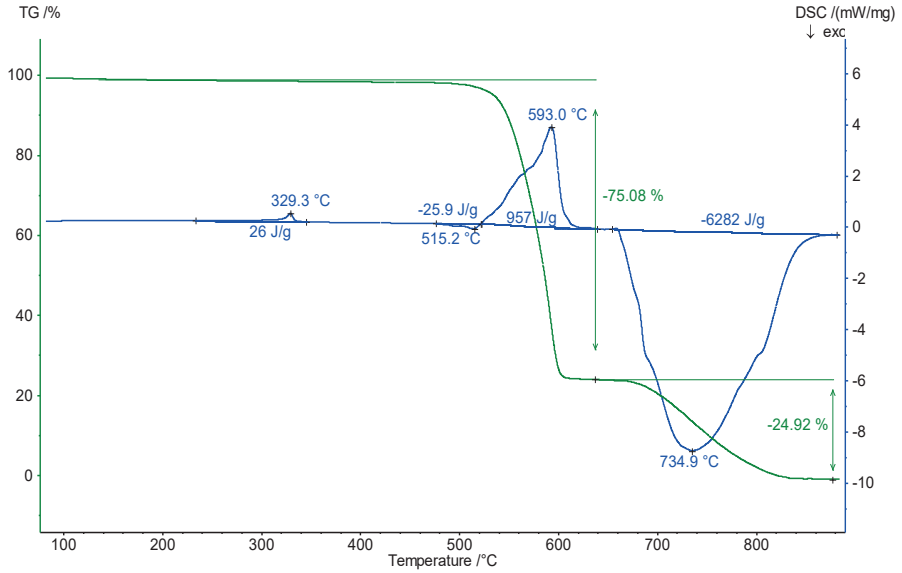
APPLICATION**SHEET**

Polymers · Polymer Manufacturing
STA 2500 *Regulus*

PTFE Materials

Introduction

Teflon is the brand name of polymer polytetrafluoroethylene (PTFE) discovered in 1938 and introduced as a commercial product in 1946. It is, for example, used as a non-sticking coating for pans and other cookware. PTFE is very non-reactive, and therefore often used in containers and pipework for reactive chemicals. PTFE has excellent dielectric properties making it eminently suitable for use as an insulator in cables and connector assemblies and as a material for printed circuit boards. Combined with its high melting temperature, this makes it the material of choice as a high performance substitute for the weaker and more meltable polyethylene that is commonly used in low-cost applications. Due to its low friction, it is used for applications where sliding action of parts is needed: bearings, bushings, gears, slide plates, etc. For these applications, versions of teflon with mineral oil, carbon or molybdenum disulfide embedded as additional lubricants in its matrix are being manufactured.



Test Conditions

Temperature range:	RT ... 900°C
Heating/cooling rates:	10 K/min
Atmosphere:	N_2/O_2 at 75 ml/min
Sample mass:	7.55 mg
Crucible:	Pt
Sensor:	TGA-DSC type S

Test Results

The PTFE material was measured in a dynamic nitrogen atmosphere at temperatures below 650°C. At 329°C, a melting peak was observed in the DSC signal. Between ~400°C and 600°C, the pyrolytic decomposition of the PTFE component occurred. At 650°C, the gas atmosphere was switched to dynamic oxygen atmosphere leading to the burn-up of the carbon black (see the strongly exothermal DSC signal together with the mass-loss step between ~650°C and 900°C). The sample was completely combusted during the experiment. This measurement demonstrates the possibility of characterizing and identifying polymers and compounds using the STA technique (simultaneous TGA and true DSC).

NGB · Application Sheet 060 · E · 0621 · Technical specifications are subject to change.

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