



15. Nylon study using Tritec Fluid Bath

Instrument: Tritec 2000 Dynamic Mechanical Analyser

Sample: Nylon Fishing Line

Geometry: Tension

%RMS strain: 0.09

Frequencies (Hz): 1.0

Thermal profile: Thermal scan 15°C – 100°C @ 2 °C/min (Fig.1)
Isothermal at 50°C for 1.5hrs (Fig.2)

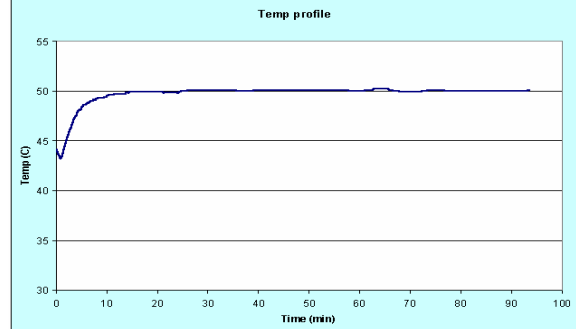
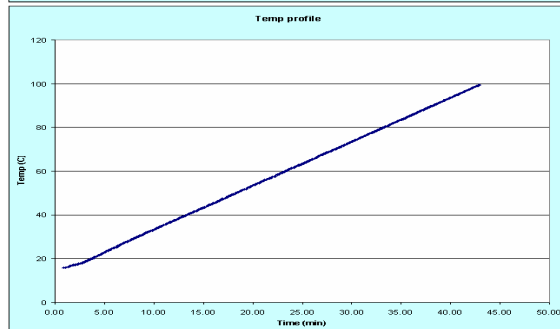
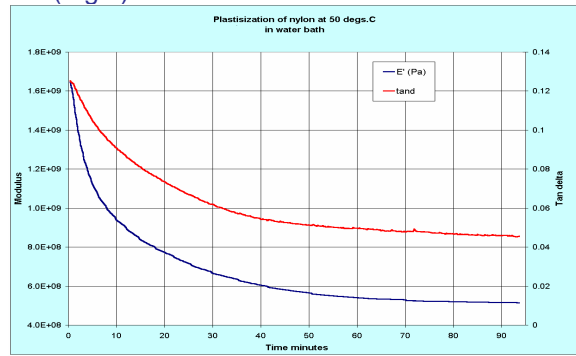
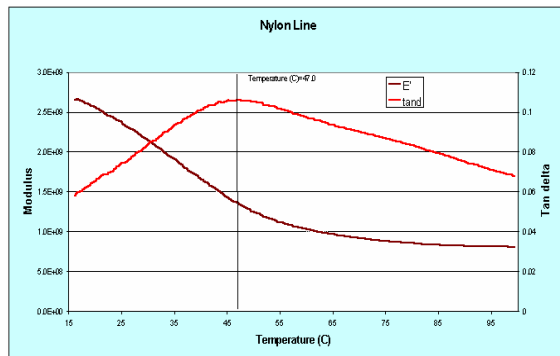


Fig.1

Fig.2

Comments:

Fig.1 shows a normal thermal scan of the Nylon line at 2°C/min using the standard Tritec oven in air. Fig.2 shows the same Nylon line upon immersion in water at 50°C using the Tritec Fluid Bath. The bath was maintained at 50°C for 1.5hrs. Note that the modulus and tan delta values decay rapidly over the first 40 to 50 minutes as water is absorbed by the Nylon line plasticising the Nylon and effectively shifting the glass transition to lower temperatures.

Note as well the thermal control of the bath. This clearly indicates that control of +/- 0.1°C was achieved easily within a very short time after immersion. Note that the bath was pre-heated to 50°C prior to immersion to keep the re-heat time as low as possible.

With this approach, it is clearly very easy to establish rates of plasticisation of polymers such as Nylon.