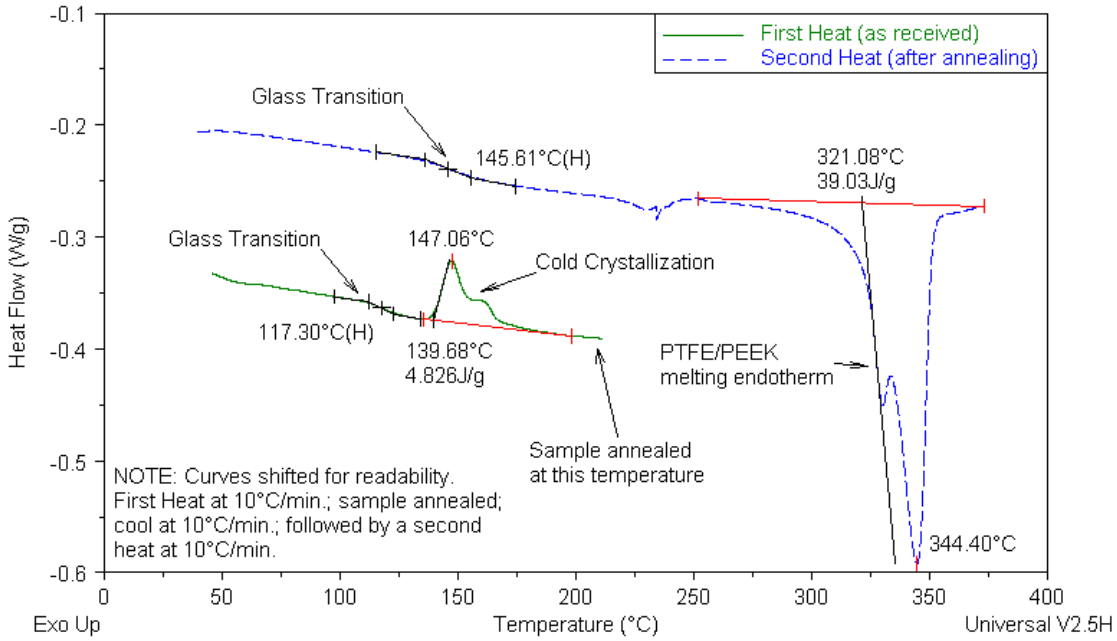
THERMAL SOLUTIONS

PTFE/PEEK/Carbon Fiber Blend Analysis by DSC



DSC measures the temperatures and heat flows associated with transitions in materials as a function of temperature or time in a controlled atmosphere. This technique provides quantitative and qualitative information about physical and chemical changes that involve endothermic or exothermic processes, or changes in heat capacity.

The above plot shows DSC experiments run on a sample of a PTFE/PEEK/Carbon fiber blend o-ring part. The as received sample exhibits cold crystallization before the melt. Annealing the sample at a temperature just above the crystallization exotherm allows the cold crystallization process to go to completion. After cooling, the second heating scan shows a small endotherm representing the melting of the crystals formed during the annealing time followed by the PTFE/PEEK melting endotherm.

The glass transition temperature has shifted to a higher temperature due to reduced chain mobility as a result of the increased crystallinity of the sample. In addition, the presence of a glass transition in the second heating scan is evidence of a slight amount of amorphous phase remaining in the sample. This example shows how DSC can characterize materials on an as received and after processing basis.