

Keywords: Dynamic Mechanical Analysis (DMA), glass transition temperature (Tg), printed circuit board (PCB), thermoset, modulus, tan delta

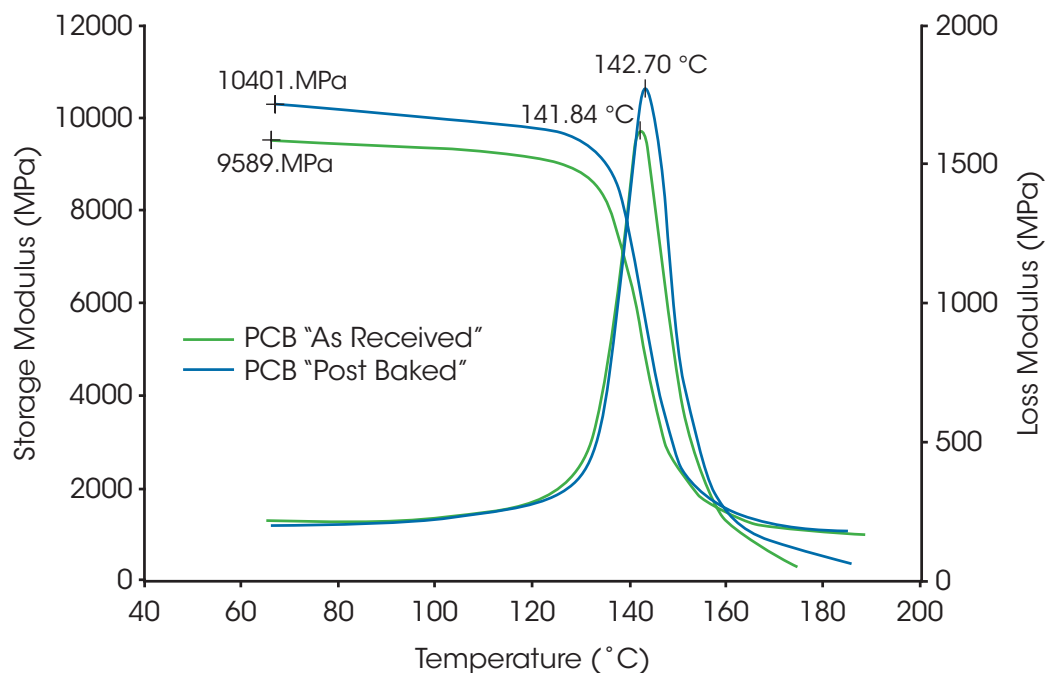
TA392

DMA measures the modulus and damping (energy dissipation) properties of materials as the materials are deformed under a periodic stress or strain. These measurements provide quantitative and qualitative information about the performance of materials. DMA is particularly useful for evaluating mechanical properties of viscoelastic polymeric materials which exhibit time, frequency, and temperature effects.

PCB materials are comprised of fiberglass braid impregnated with a thermosetting resin. Characterization of the resin glass transition temperature can sometimes be difficult by DSC because of high fiber content. DMA, because of its inherent sensitivity to the glass transition, is an ideal technique for

identifying the Tg of these highly filled systems. The plot below shows two sets of curves for a highly filled PCB material. The solid line curves represent the data for the material "as received". The dashed line curves represent data for the "post baked" or annealed sample. Note the slight increase in Tg and the higher initial modulus value as a result of additional curing. This is a clear demonstration of DMA's utility for characterizing the degree of cure and the final mechanical properties of filled PCB or thermosetting materials.

For more information or to place an order, go to <http://www.tainstruments.com/> to locate your local sales office information.



DMA Experimental Conditions:  
 Clamp Type: Single Cantilever  
 Temp. Range: 50 °C to 200 °C  
 $\beta = 5 \text{ }^\circ\text{C/min.}$   
 Frequency = 1 Hz  
 Amplitude = 50  $\mu\text{m}$