

# Thermal Imaging of Anisotropic Thermal Conduction in Cross-Linked Polymer

## **Abstract:**

Polymer processing flows involve a strong coupling of mechanical and thermal effects that have a significant impact on the final properties of the material. Simple molecular arguments suggest that Fourier's law must be generalized to allow for a tensorial thermal conductivity in polymers subjected to deformation. In this study, we investigate the effects of anisotropic thermal conduction in cross-linked polymers subjected to uniaxial elongational deformation. This involves a combination of experiments based on the technique of infrared thermography, and theoretical modeling. The results of this study are used in conjunction with complimentary experiments from our laboratory that directly measure flow-induced anisotropy in polymeric materials.