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Observations of the Diffraction Pattern Produced by the Surface Thermal Lensing (STL) Technique Applied to Polymers DAEHA JOUNG, MARSHALL THOMSEN, DONALD SNYDER, Eastern Michigan University — In the Surface Thermal Lensing (STL) technique, an intense chopped pump beam irradiates a sample perpendicularly. The result is localized deformation of the surface, a thermal bump, due to thermal expansion. The nature of the thermal bump depends on thermal, optical, and mechanical properties of the sample. If the sample is a polymer, additional orientational changes may take place within the molecules. These various changes are detected using a larger size, weak probe beam focused on the same spot. In inorganic samples, the resulting diffraction pattern in the reflected probe beam is attributed to the thermal bump and the temperature dependence of the index of refraction. We report evidence that in polymer samples, local, polarization dependent variations in the reflectivity may also influence the diffraction pattern. Diffraction patterns with and without polarizers intercepting the probe beam will be discussed, and the results will be compared qualitatively to a simple, one-dimensional diffraction model.

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