Abstract Submitted
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Broadband Terahertz Refraction Index Dispersion and Loss of Polymeric Dielectric Materials[1] ELAHEH MOTAHARIFAR, student, RASHAUNDA HENDERSON, JULIA W. P. HSU, MARK LEE, Professor, SEMICONDUCTOR RESEARCH CORPORATOPN COLLABORATION — Reliable permittivity data over a broad THz frequency range is important for many dielectric materials of potential use in very high frequency electronics. At THz frequencies, resonant lattice and bond dynamics result directly in dramatic dispersion and large dielectric loss in certain frequency bands in the THz, so it is critical to have quantitative knowledge of a dielectric material's complex index characteristics. \pardHere we present broadband measurements (3-75 THz) of the complex index spectra of some polymeric dielectric materials often used in high frequency electronics. Reflection and transmission spectra were made using a Fourier transform spectroscopy on free-standing material samples. Data were analyzed using two different models to extract complex refractive index as a function of frequency. The first model covers frequency regimes away from strong molecular bond where propagation loss is low enough that multiple partial reflections from front and back surfaces contribute to measured reflectance and transmittance. The second model is for frequency ranges spanning infrared active molecular bond resonances where loss and dispersion can become very large, causing zero transmittance. Molecular bond resonances, frequency windows of low loss, and anti-windows of high loss are identified.

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