

Abstract Submitted
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Precision Measurement of the Microwave Properties of a Select Liquid Crystal JAMES ROBERTS, AMAN ANAND, University of North Texas, JAI DAHIYA, Southeast Missouri State University — A cylindrical microwave resonant cavity in the TE_{011} mode is used to study the microwave dielectric response of liquid crystal p-azoxyanisole at microwave frequencies. The dielectric behavior of this liquid crystal is studied as a function of frequency from 8.0 GHz to 10.2 GHz. The real and imaginary parts of the complex dielectric constant of this liquid crystal are calculated by using Slater's Perturbation Equations and the relaxation time is calculated using Debye's Equation for polar molecules. The microwave resonant cavity is interfaced to a computer and the dielectric relaxation data is taken using this computer interface. The frequency shift and the Q-changes of the signal are determined experimentally by using a computer interface. Manually tracking the markers can be very time consuming as well as erroneous sometimes. With the use of the computer interfaced resonant cavity this error is reduced dramatically and proves to be efficient. The computer also performs the calculations of the real and imaginary parts of the dielectric constant of the material under study and at the same time plots graphs of frequency shifts and Q-changes as a function of applied frequency for this experiment related to the microwave dielectric response of this liquid crystal.

James Roberts
University of North Texas

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