have been measured for the first time in the temperature ranges of 300 to 77 K for the (100) sample, 300 to 100 K for the (110) sample, and 300 to 110 K for the (111) sample. The TOE constant C_{111} and two combinations of the other TOE constants and their temperature dependence have been obtained. The results are compared with theory describing interatomic forces in alkali halide crystals. [Research supported in part by the ONR and the UT-ORNL Science Alliance.]

2:45

J6. Dissipative structure of shock waves in fluids having large specific heat. M. S. Cramer (Department of Engineering Science and Mechanics, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061)

Recent studies indicate that the nonlinearity parameter $1 + B/2A$ may become negative in fluids whose specific heats are sufficiently large. The present study examines the dissipative structure of weak shocks in such fluids and contrasts the results obtained with those of the classical Taylor structure. Estimates for the thickness will also be presented. Conditions under which the thickness increases, rather than decreases, with increasing shock strength will be given.

3:00

J7. Ultrasonic absorption in the critical mixture of methanol and cyclohexane. Steven J. Fast, S. S. Yun, and F. B. Stumpf (Department of Physics and Astronomy, Ohio University, Athens, OH 45701)

The ultrasonic data for the critical mixture of methanol and cyclohexane are analyzed using the dynamic scaling theory. The experimental value of the slope of α/f^2 at the critical temperature versus $f^{-1.06}$ is compared to the theoretical value. The plot of α/f^2 at the critical temperature versus $f^{-1.06}$ yields a straight line as predicted by theory. The experimental values of α/α_c for methanol and cyclohexane are compared to the scaling function $F(\omega^*)$ and to the values of α/α_c of ^{3}He and Xe.

3:15

J8. Anomalies in the scattering-induced attenuation of backscattered ultrasonic waves. Peter B. Nagy and Laszlo Adler (Department of Welding Engineering, The Ohio State University, Columbus, OH 43210)

Scattering-induced ultrasonic attenuation offers a simple way to characterize quantitatively material inhomogeneities. This method has a wide range of applications from tissue characterization to ultrasonic NDE such as grain size measurement in polycrystalline materials and porosity assessment in cast metals. The scattering-induced attenuation of a through-transmitted well-collimated ultrasonic wave can be readily related to certain characteristics of the inhomogeneity via its total scattering cross section. In many cases, ultrasonic attenuation measurement is not feasible except from the backscattered signal. For want of better approximation, the scattering-induced attenuation is presumed to have the same relation to the inhomogeneity as if it were measured by the simpler transmission technique. Experimental results are presented to show that the backscattered signal is much less attenuated than is predicted by the plane-wave approximation, and that this effect is not simply due to multiple scattering. Furthermore, it is shown that the scattering-induced attenuation of the incoherent backscattered signal is mainly due to backward scattering, while strongly forward scattering inhomogeneities, such as surface roughness, will cause negligible attenuation. [Work sponsored by the Air Force Wright Aeronautical Laboratories/Materials Laboratory under Contract No. W-7405-ENG-82 with Iowa State University.]

3:30

J9. Effects of fiber motion on the acoustical behavior of an anisotropic, flexible fibrous material. Milo D. Dahl, Edward J. Rice, and Donald E. Groesbeck (National Aeronautics and Space Administration, Lewis Research Center, Cleveland, OH 44135)

The acoustic behavior of a flexible fibrous material was studied experimentally. The material consisted of cylindrically shaped fibers arranged in a batting with the fibers primarily aligned parallel to the face of the batting. This type of material was considered anisotropic with the propagation constant depending on whether the direction of sound propagation was parallel or normal to the fiber arrangement. Normal incidence sound absorption measurements were taken over the frequency range of 140–1500 Hz and with bulk densities ranging from 0.0046–0.067 g/cm^3. When the sound propagated in a direction normal to the fiber alignment, the measured sound absorption showed the occurrence of a strong resonance that increased absorption above that attributed to viscous and thermal effects. A model for the material indicated that this resonance was due to fiber motion. When the sound propagated in a direction parallel to the fiber alignment, indications of the additional sound absorption due to fiber motion were not present in the data.

3:45

J10. Effect of ambient pressure on the pressure wave from the rapidly expanding bubble. Ho-Young Kwak[a] (Sibley School of Mechanical and Aerospace Engineering, Cornell University, Ithaca, NY 14853)

Calculation on the intensity of evaporation and the rapidly expanding bubble formed from the droplet at the superheat limit is calculated. An analysis is presented for the amplitude of the pressure wave generated by the rapidly expanding bubble. For estimating the amplitude, linear acoustics theory for the evaporating droplet and the Rayleigh equation for the expanding bubble are employed. The result shows that the amplitude and the frequency of the pressure wave depend crucially on the difference in pressure between vapor within the bubble and the surrounding liquid. This result is in qualitative agreement with previous experiment. [a] On leave of absence from Chung-Ang University, Seoul, Korea.

4:00

J11. Forced radial oscillations of single cavitation bubbles: Period-doubling, chaos, and hysteresis. R. G. Holt and L. A. Crum (Physical Acoustics Research Laboratory, Department of Physics, University of Mississippi, Oxford, MS 38677)

Utilizing an optical scattering technique previously reported [J. Acoust. Soc. Am. Suppl. 1 **80**, S24 (1986)], the radial response of a single bubble to an acoustic field has been observed and analyzed. A scattered light intensity versus radius transfer function has been obtained for the system, enabling a quantitative description of the radius versus time. Some universal features of driven nonlinear systems have been observed, among them period-doubling, chaotic solutions (with corresponding fractal attracting sets in the phase plane), and bistability due to hysteresis in the resonance structure. [Work supported by ONR.]