Abstracts of Papers by Bell System Authors Published in Other Journals

CHEMISTRY

Brillouin Scattering and Hypersonic Relaxation in Amorphous Polymers. G. D. Paterson, Polym. Preprints, *17* (August 1976), pp. 13–16. Hypersonic relaxation is studied in amorphous polyisobutylene, atactic polypropylene, atactic polyvinyl acetate, atactic polystyrene, and bisphenol-A polycarbonate. The hypersonic loss tan δ is measured as a function of temperature by Brillouin spectroscopy. Only a single loss maximum is observed for the polymers studied in this work. The loss maximum correlates well with other mechanical relaxation data.

COMPUTING

New and Simple Light-Pen Detection Technique for Interactive Plasma Display Systems. P. D. T. Ngo, IEEE Trans. Electron. Dev. 23, No. 9 (September 1976), pp 1058–1063. Two interrogating pulses are applied to an addressed cell of a plasma panel. If in the "on" state the cell is flashed once by the first pulse; if "off", by the second. Cell state is not altered. A light pen is gated to look for a flash to establish pen location and cell state.

ELECTRICAL AND ELECTRONIC ENGINEERING

Direct Observation of the Optical Plasma Resonance of Ag by Photon-Assisted Tunneling. R. K. Jain, M. G. Farrier*, and T. K. Gustafson*, Phys. Rev. Lett., *36*, No. 8 (1976), pp. 435–438. Photon-assisted tunneling is proposed for the investigation of optical plasma resonances; this is demonstrated by the direct observation of the Ag resonance in appropriate Ag-$A\ell_2O_3$–$A\ell$ structures. A spectral scan of the ratio of the signals photo-induced by the p- and s-polarizations shows a large enhancement corresponding to the plasma resonance of Ag. *University of California, Berkeley.

Encapsulation of Integrated Circuits Containing Beam Leaded Devices with a Silicone RTV Dispersion. D. Jaffe, Proc. 1976 Electron. Compon. Conf. (April 1976), pp. 376–381. A number of evaluations of a xylene based RTV silicone rubber dispersion for the encapsulation of integrated circuits containing beam leaded silicon integrated circuit (SIC) devices are described. These include: (1) material properties, (2) application techniques, and (3) performance in some initial accelerated bias-humidity and temperature cycling tests.

Discharge Pumping of Dye Vapors. P. W. Smith, P. F. Liao and P. J. Maloney, IEEE J. Quantum. Electron., *12*, No. 9 (September 1976), pp. 539–542. We report the results of a study of discharge-excited dye vapors. For 20 dyes, fluorescence output was measured as a function of buffer gas, temperature, and discharge parameters. Although fluorescence efficiencies as high as 6% were obtained at low power, saturation effects limited the output fluorescence to values corresponding to gains of less than 0.2 cm^{-1}.

Distributed-Feedback Color Center Lasers in the 2.5 to 3.0 μm Region. G. C. Bjorklund, L. F. Mollenauer and W. J. Tomlinson, Appl. Phys. Lett., *29*, No. 2 (August 15, 1976), pp. 116–118. We have demonstrated pulsed distributed-feedback laser action in KCl:Li containing F_A(II) color centers with spatially modulated concentrations. Laser outputs at various wavelengths between 2.6 and 2.8 μm have been observed with linewidths narrower than 0.2 nm. The absorbed pump power at threshold was 1.5 kW, and efficiencies of up to 6.7% were measured.

Lineshape and Strength of Two-Photon Absorption in an Atomic Vapor with a Resonant or Near-Resonant Intermediate State. J. E. Bjorkholm and P. F. Liao, Phys. Rev., *14,* No. 2 (August 1976), pp. 751–760. We experimentally and theoretically consider two-photon absorption in a vapor with a resonant intermediate state. It is shown that maximum absorption rates and Doppler-free linewidths are *simultaneously* obtained. The experimental dependence of the lineshape and absorption rate upon mistuning from the intermediate state is in good agreement with theory.

Photodecomposition in Popop Dye Vapor Lasers. P. F. Liao, P. W. Smith and P. J. Maloney, Opt. Commun., *17,* No. 3 (June 1976), pp. 219–222. Experimental evidence is presented which shows that the premature termination of dye vapor laser gain observed in optical pumping experiments is due to photodecomposition. Addition of up to 4 atm of buffer gases was found to have little effect.

A Tester Independent Program Language. R. P. Davidson, Digest of Papers: 1976 Semicond. Test Symposium (October 1976), pp. 76–77. An integrated circuit (IC) designer writes test procedures for his devices in tester independent format (TIF) without being required to have detailed knowledge of the target system. Test requirements are defined in terms of device pins, stimuli (i.e., current/voltage), and timing. A language translator converts this information to a test program for a target machine.

MATERIALS SCIENCE

Brillouin Scattering from Poly(Vinylidene Fluoride)-Poly(Methyl Methacrylate) Mixtures. G. D. Patterson, T. Nishi* and T. T. Wang, Macromolecules, *9* (1976), pp. 603–605. The polymer blend of poly(vinylidene fluoride) and poly(methyl methacrylate) has been studied with Brillouin spectroscopy. The mixtures are shown to be compatible in the melt. Quenched films display a single glass-rubber relaxation temperature. The crystallization and melting behavior of the films was also studied above T_g.
* Bridgestone Tire Co., Tokyo, Japan.

The Conformational Characteristics of Poly(Vinylidene Fluoride). A. E. Tonelli, Macromolecules, *9* (1976), pp. 547–551. Approximate energy estimates have been utilized to evaluate the conformational characteristics of poly (vinylidene fluoride) (PVDF) including its dimensions, dipole moments, their temperature dependence, and the conformational contribution to the entropy of fusion. Calculated results were insensitive to small amounts of reverse monomer addition, but did depend markedly upon the value selected for the dielectric constant (ϵ). Agreement between calculated and observed properties was possible for $4 < \epsilon < 6$.

The Effect of Adsorbed Gases and Temperature on the Photovoltage Spectrum of GaAs. S. C. Dahlberg, J. Vac. Sc. Technol., *13* (September/October 1976), pp. 1056–1059. The photovoltage spectrum for GaAs (100) after Ar bombardment and with a variety of adsorbed gases (O_2, NH_3, NO, SO_2, H_2S, CO_2) has been measured. The above bandgap photovoltage shows structure which is surface sensitive, and this structure is tentatively attributed to transitions involving surface states. Heating causes a transient loss of photovoltaic activity.

Environmental Testing with Giant Aerosols: Exposure of Miniature Relays. T. E. Graedel, J. P. Franey, and R. E. Schwab, Elec. Contacts/1976, *25* (1976), pp. 47–55. Techniques have been devised for generating chemically inert giant (i.e., $d > 20\mu m$) aerosols, and for exposing relay components to aerosol concentrations ~30 times those typically encountered in field operation. The successful relay performance indicates that physical contact blockage may be avoided in field operations by appropriate air filtration and housing design.

Fermi Surface Measurements in Normal and Superconducting 2H-$NbSe_2$. J. E. Graebner and M. Robbins, Phys. Rev. Lett., *36* (February 1976), pp. 422–425. Landau quantum oscillations are observed for the first time in the layered, superconducting, incommensurate charge density wave compound 2H-$NbSe_2$. The oscillations are observed clearly above H_{c2} but also *below* H_{c2}, with somewhat increased scattering. This is interpreted as scattering of the orbiting normal electrons from the flux lattice. The observed sheet of Fermi surface can be explained if Mattheiss' APW band structure is modified slightly.

NO Line Parameters Measured by CO Laser Transmittance. R. E. Richton, Appl. Opt., *15* (July 1976), pp. 1686–1687. By measuring the transmittance of two CO laser lines through NO and NO with N_2 added, and assuming an extinction coefficient given by a Voigt profile, line parameters for each Λ-doubled component are determined. These parameters can be applied to remote atmospheric sensing and to find chemical reaction rates.

Paramagnetic States and Hopping Conductivity in a Chalcogenide Glass: As_2Te_3. J. J. Hauser and R. S. Hutton, Phys. Rev. Lett., *37* (September 27, 1976), pp. 868–871. Variable-range hopping as evidenced by a resistivity proportional to $\exp T^{-1/4}$ and by the two-dimensional behavior of thin films has been observed for the first time in a chalcogenide glass. This was accomplished by sputtering As_2Te_3 at 77°K. The localized paramagnetic hopping states have also been established by the existence of an ESR signal.

Polyethylene and Polytetrafluoroethylene Crystals: Chain Folding, Entropy of Fusion, and Lamellar Thickness. A. E. Tonelli, Polymer, *17* (1976), pp. 695–698. Chain folding in polyethylene (PE) and in polytetrafluoroethylene (PTFE) crystallites is simulated on the computer. Adjacently re-entering chain folds are found to be much more easily formed in PE than in PTFE. However, the relative energies required to create a unit area of chain fold are estimated to be nearly the same for both polymers and cannot be the source of the large difference in their lamellar thicknesses.

Spectroscopic Study of RF Oxygen Plasma Stripping of Negative Photoresists. I. Ultraviolet Spectrum. E. O. Degenkolb, C. J. Mogab, M. R. Goldrick and J. E. Griffiths, Appl. Spectrosc., *30* (September 1976), pp. 520–527. The stripping of photoresists from a silicon wafer using an rf oxygen plasma has been monitored using the optical emission from electronically excited OH and CO species in the ultraviolet region of the spectrum. The endpoint of plasma stripping and the amount of stripped material is easily determined quantitatively.

Sulfur Dioxide, Sulfate Aerosol, and Urban Ozone. T. E. Graedel, Geophys. Res. Lett., *3* (1976), pp. 181–184. Kinetic chemical computations for the suburban New Jersey troposphere indicate the daily production of $\sim 1\ \mu g/m^3$ of sulfate aerosol, largely through sulfuric acid, and demonstrate that SO_2 and its products are slight inhibitors to ozone production.