

Abstracta

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Trabalhos Aceitos para Publicação

A047-98 à A052-98

Trabalho Aceito em Congresso

C021-98 à C027-98

A 047-98 Subsurface Microscopy of Biased MOSFET Structures: photothermal and electroreflectance images.

Batista, J. A., Mansanares, A. M., da Silva, E. C., Pimentel, M. B. C., Jannuzzi, N. and Fournier, D.

In this work we use reflectance microscopy to investigate biased MOSFET structures. A resolution of micrometer is achieved by using visible laser light to probe the gate surface, and both electroreflectance and thermorefectance components were found in the signal. Image contrast depends upon the bias configuration, and a total of six different types of images can be obtained. The high ability of the technique to detect subsurface defects is also demonstrated.

Sensors and Actuators A: Physical 71 (1-2), 40-45, 1998

A 048-98 Heat Source Distribution, Vertical Structure and Coating Influences on the Temperature of Operating 0.98 m Laser Diodes: photothermal reflectance measurements.

Dacal, L. C. O., Mansanares, A. M. and da Silva, E. C.

In the present work single-quantum-well laser diodes operating at 0.98 m m are investigated by photothermal reflectance microscopy. Temperature maps were obtained for the output facet of all devices studied. Furthermore, the temperature distribution was determined along the cavity (on the ridge) of lasers soldered with the junction side up. Near the facets, the measured temperature was found to be about seven times the bulk's temperature, indicating the presence of an important surface heat source. The signal phase distribution of the laser facet shows the important role of the vertical structure on the heat confinement. Comparison between experiments and calculations shows that the confinement layers (GaAlAs and GaInP) thermal parameters are the principal responsible for the heat propagation in these structures, near the active region. The same calculations show the role of the coating (Al₂O₃) in the heat propagation, and give a quantitative ratio between surface and bulk heat sources. Measurements made on the facet and on the ridge as a function of injection current were found to present a quite similar behavior, leading to the conclusion that thermal effects are strongly dominant in these measurements, masking any carrier or electroreflectance effects. Finally, measurements made in different light output power conditions and in the same injection current conditions showed that the surface heat source is caused by laser light absorption at the facets.

Journal of Applied Physics 84 (7), 41-52, 1998

A 049-98 Elastic Scattering of Low-Energy Electrons by Ozone.

Bettega, M. H. F., Varella, M. T. do N., Ferreira, L. G., and Lima, M. A. P.

We report results from an "ab initio" calculation of low-energy electron scattering by ozone molecules. Applying the Schwinger multichannel method with pseudopotentials, we calculated elastic integral, differential and momentum transfer cross sections in an energy range from 6 eV up to 30 eV. We compare our results with available theoretical results and with available experimental data. In particular, our integral cross section shows two shape resonances, for A₁ and B₂ symmetries, which agree with the theoretical results of Sarpal et al., of Lee et al. And with the observations of Allan et al.

Journal of Physics B-Atomic Molecular and Optical Physics 31 (19), 4419-4426, 1998

A 050-98 Transition from Kondo to Intermediate Valence Regime in (La_{1-x}Ce_x)Ni: an ESR study.

Medina, A. N., Gandra, F. G., Azanha, W. R. and Cardoso, L. P.

We report on Electron Spin Resonance (ESR) results for the series of compounds (La_{1-x}Ce_x)Ni doped with Gd. We show that from the Gd g-value and linewidth one can determine the concentration x_c where the systems goes from Kondo single impurity to Kondo lattice (and intermediate valence) regimes. The observed behavior in both, the g-value and the slope of the linewidth vs. T curves are explained using the indirect interaction between Gd and Ce moments. The calculation leads to the determination of the Ce-Gd exchange parameter J_{Ce-Gd} = 4.8 meV and the Ce - conduction electrons exchange parameter |J_{f-g}| = 19 meV, for x=1.

Journal of Physics-Condensed Matter 10 (43), 9763-9768, 1998

A 051-98 On the Statistical Foundations of Irreversible Thermodynamics.

Luzzi, R., Vasconcellos, A. R., Galvão Ramos, J.

We briefly, and partially, consider aspects of the present status of phenomenological irreversible thermodynamics and nonequilibrium statistical mechanics. After short comments on Classical Irreversible Thermodynamics, its conceptual and practical shortcomings are pointed out, as well as the efforts undertaken to go beyond its limits, consisting of particular approaches to a more general theory of Irreversible Thermodynamics. In particular, a search for statistical - mechanical foundations of Irreversible Thermodynamics, namely, the construction of a statistical thermodynamics, are based on the Nonequilibrium Statistical Operator Method. This important theory for the treatment of phenomena at the macroscopic level, is based on a microscopic molecular description in the context of a nonequilibrium ensemble formalism. We draw attention to the fact that this method may be considered to be encompassed within Jaynes' Predictive Statistical Mechanics and base on the principle of maximization of informational entropy. Finally, we describe low, in fact, the statistical method provides foundations to phenomenological irreversible thermodynamics, thus giving rise to what can be referred to as Informational Statistical Thermodynamics.

Fortschritte der Physik 47 (4), 401-432, 1998

A 052-98 Mechanical and SQUID Measurements on Nb Thin Films: learning from a Conventional low-temperature superconductor.

Esquinazi, P., Höhne, R., Kopelevich, Y., Pan, A. and Ziese, M.

Vibrating reed, torque and SQUID measurements on Nb networks of strand widths between 200 nm and 550 nm as well as on Nb thin films of thickness 120 nm and 1.2 m m have been performed. Our results indicate that in samples with thickness ~10x GL a flux line lattice exists in the complete field range B_{c1} ≤ B ≤ B_{c2}, with B_{c2}(T, q = 0) = B_{c3}(T) the surface superconductivity critical field, and B_{c2}(T, q = 90°) = B_{c2}(T), being q the angle between field and main surface. When the transversal correlation length R_c is of the order of the strand width, the flux line lattice undergoes a dimensional crossover which increases its pinning strength. Anomalies in the magnetization are observed at fields which are consistent with the matching fields for formation and splitting of vortex chains. Magnetization measurements reveal also the existence of a "second magnetization peak" (SMP) well below the upper critical field, similar to those measured in Bi₂Sr₂CaCu₂O₈ (Bi₂212) crystals and other nonconventional superconductors. We argue that the SMP's measured in Nb and also in Bi₂212 crystals are due to thermomagnetic flux jump instability and are not related to an enhancement of the critical current density produced by phase transitions of the flux-line lattice.

Physics and Material Sciences of Vortex States, Flux Pinning and Dynamics, USA, 149-172, 1999

ACCEPTED PAPERS FOR CONFERENCE PRESENTATION

C 021-98 Thermal Diffusivity Measurements in Lyotropic Ferronematics: mode mismatched thermal lens. Pereira, J.

R. D., Mansanares, A. M., Palangana, A. J. and Baesso, M. L.

The mode mismatched thermal lens technique was used in the determination of thermal diffusivity of oriented lyotropic liquid crystal doped with ferrofluid. It was found that the behavior of the parallel thermal diffusivity as a function of ferrofluid content could not be explained in terms of the order parameter alone. Additional contribution coming from the ferrofluid itself seems to be necessary for the interpretation of the experimental data.

17th International Liquid Crystal Conf. Strasbourg, França, 19-24 de julho de 1998, accepted on July 1998.

C 022-98 Photothermal Reflectance Microscopy Applied to the Study of Electrostatic Discharge Degradation in MOSFET Structures.

Batista, J. A., Mansanares, A. M. and da Silva, E. C., Pagani Jr., O. J., Eleutério Filho, S., Pimentel, M. B. C. and Jannuzzi, N.

In this work we investigated the effect of electrostatic discharge (ESD) on five n-channel MOSFET structures using the Photothermal Reflectance Microscopy. The 20 m m x 20 m m gate area transistors were submitted to ESD pulses on a zap system that respects the Human Body Model (HBM). The pulse intensity varied from 40 V to 140 V in a cumulative sequence. Electrical characterization showed that the threshold voltage was no longer positive for pulses of 110 V or above. No significant changes in the photothermal maps were observed in these cases. For pulses of 140 V a large leakage current appeared, and the photothermal maps revealed a strong peak (localized spot) which is associated to the induced damage.

13th International Conf. on Microelectronics and Packaging-Curitiba, 12-14 de agosto de 1998, accepted on August 1998.

C 023-98 Electrostatic Discharge Degradation in MOSFET Structures Investigated by Photothermal Reflectance Microscopy.

Batista, J. A., Mansanares, A. M., da Silva, E. C., Pagani Jr., O. J., Eleutério Filho, S., Pimentel, M. B. C. and Jannuzzi, N.

In this work we investigated the effect of electrostatic discharge (ESD) on five n-channel MOSFET structures using the Photothermal Reflectance Microscopy. The 20x20 m m² gate area transistors were submitted to ESD pulses on a zap system that respects the Human Body Model (HBM). Pulse intensities varied from 40 V to 140 V in a cumulative sequence. Electrical characterization showed that the threshold voltage was no longer positive for pulses of 110 V or above. No significant changes in the photothermal maps were observed in these cases. For pulses of 140 V a large leakage current appeared, and the photothermal maps revealed a strong peak (localized spot) which is associated to the induced damage.

X International Conference on Photoacoustic and Photothermal Phenomena, Roma, 23-27 de agosto de 1998, accepted on August 1998.

C 024-98 PAS Investigation of Cu and Mn Metal Ions Incorporation in Molecular Sieves.

Silveira, D. M., Pastore, H. O., Yáñez-Limón, J. M., Mansanares, A. M. and da Silva, E. C.

In this work we characterized Mn²⁺ and Cu²⁺ incorporated molecular sieves by photoacoustic absorption spectroscopy (PAS). The ions were incorporated as highly octahedral complexes placed in the intrazeolitic channels (interstitial sites). No substitutional sites were detected. The pH of the reaction mixture was found to be the most important synthesis parameter for the ions incorporation.

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C 025-98 Thermal Diffusivity Measurements in Lyotropic Ferronematics: mode mismatched thermal lens.

Pereira, J. R. D., Mansanares, A. M., da Silva, E. C., Palangana, A. J., Baesso, M. L.

The mode mismatched thermal lens technique was used in the determination of thermal diffusivity of oriented lyotropic liquid crystal doped with ferrofluid. It was found that the behavior of then parallel thermal diffusivity as a function of ferrofluid content cannot be explained in terms of the order parameter alone. Additional contribution coming from the ferrofluid itself seems to be necessary for the interpretation of the experimental data.

X International Conference on Photoacoustic and Photothermal Phenomena, Roma, 23-27 de agosto de 1998, accepted on August 1998.

C 026-98 Heat Source Distribution, Vertical Structure and Coating Influences on the Temperature of Operating 0.98 m m Laser Diodes: Photothermal Reflectance Measurements.

Dacal, L. C. O., Mansanares, A. M., da Silva, E. C.

In the present work, single quantum well laser diodes operating at 0.98 m m are investigated by photothermal reflectance microscopy. We show the importance of the surface heat source and vertical structure on the temperature profile. Measurements made in different light output power conditions and in the same injection current conditions showed that the surface heat source is caused by laser light absorption at the facets.

X International Conference on Photoacoustic and Photothermal Phenomena, Roma, 23-27 de agosto de 1998, accepted on August 1998.

C 027-98 Transport of Oxygen and Heat in Leaves During Photosynthesis Studied Photoacoustically on in Vivo Samples at Low Modulation Frequencies.

Barja, P. R., Cella, N., Korpiun, P., Magalhaes, C. N., Mansanares, A. M., da Silva, E. C. and Vargas, H.

Amplitude and phase angle of the photobaric and photothermal signal were measured without and with saturating light varying the modulation frequency between about 10 and 50 Hz. We found that the phase angle of the photobaric signal decreases with increasing frequency whereas the phase angle of the photothermal signal increases. The frequency behaviour of both the oxygen signal as well as the thermal signal can be interpreted by using a theory recently developed [4]. It shows that the phase angle of the photobaric component at low frequencies mainly depends on the permeability of the limiting membranes of the chloroplasts for oxygen. We also found that the strong increase of the phase angle of the thermal signal is consistent with theory if the mesophyll cells have an average diameter of about 25 microns which could be confirmed by direct observations with an optical microscope.

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