

Abstracta

Ano VI - N.05

Out04



TRABALHOS ACEITOS

A 024- 04 Electronic Phase-Separation in $Mg_{1-x}B_x$ Probed by CESR.

A 025- 04 Magnetic Properties of the Frustrated Antiferromagnet $LiCrO_2$.

A 026- 04 Large-Scale Quantum Effects in Biological Systems.

A 027- 04 Indication of unusual pentagonal structures in atomic-size Cu nanowires.

A 028- 04 Lock-and-Key Effect in the Surface Diffusion of Large Organic Molecules Probed by STM.

A 029- 04 Contaminants in suspended golds chains: an ab initio molecular dynamics study

TRABALHOS PUBLICADOS

AGOSTO/SETEMBRO 2004

P 144- 04 à P 163- 04

TRABALHOS ACEITOS PARA PUBLICAÇÃO EM PERIÓDICOS

A 024- 04 Electronic Phase-Separation in $Mg_{1-x}B_2$ Probed by CESR.

Urbano R.R., Pagliuso P.G., Rettori C., Cheong S.W.

Temperature dependent conduction electron spin resonance (CESR) was performed in the normal and vortex-state of $Mg_{1-x}B_2$. Fine powder of polycrystalline samples with $x @ 0$ and 0.15 were studied at 9.48 GHz ($H_0 \approx 3380$ Oe). Our results suggest the interesting effects associated with the presence of Mg deficiency in this compounds: a phase separated Mg-vacancy rich (*insulating*) and Mg-vacancy poor (*superconducting metal*) regions for the $x @ 0.15$ sample. The depinning temperature, T_p , for $x @ 0.15$ sample was obtained and confronted with previous results.

Physica C 408-410, accepted on September 2004.

A 025- 04 Magnetic Properties of the Frustrated Antiferromagnet $LiCrO_2$.

Moreno N.O., Israel C., Pagliuso P.G., Garcia-Adeva A.J., Rettori C. Sarrao J.L., Thompson J.D., and Oseroff S.B.

We report electron paramagnetic resonance (EPR) and DC susceptibility (χ) measurements on the two-dimensional Heisenberg triangular-lattice antiferromagnet $LiCrO_2$. From 150 to 615 K, the linewidth and the g -value are temperature independent, but below 150 K the linewidth broadens and g deviates from its high temperature value of 1.98 , suggesting the presence of short-range antiferromagnetic correlations in the paramagnetic phase. $\chi(T)$ for $T > T_N \approx 62$ K agrees with the predictions of the quantum-generalized constant-coupling approximation.

Physica C 272-276, accepted on September 2004.

A 026- 04 Large-Scale Quantum Effects in Biological Systems.

Marcus V. Mesquita, Áurea R. Vasconcellos, and Roberto Luzzi, Sergio Mascarenhas

Particular aspects of large-scale quantum effects in biological systems, like biopolymers and, also, microtubules in the cytoskeleton of neurons which can have relevance in brain functioning, are discussed. The microscopic (quantum mechanical) and macroscopic (quantum statistical mechanical) aspects, and emergence of complex behavior, are described. It consists of the large-scale coherent process of Fröhlich-Bose-Einstein condensation in open and sufficiently far-from-equilibrium biopolymers. Associated to this phenomenon is the presence of Schrödinger-Davydov solitons, which propagate undistorted and undamped, when embedded in the Fröhlich-Bose-Einstein condensate, thus allowing for the transmission of signals at long distances, involving a question relevant to bionergetics.

International Journal of Quantum Chemistry, accepted on September 2004.

A 027- 04 Indication of unusual pentagonal structures in atomic-size Cu nanowires

J. C. González, V. Rodrigues, J. Bettini, L. G. C. Rego, A. R. Rocha, P. Z. Coura, S. O. Dantas, F. Sato, D. S. Galvão, and D. Ugarte

We present a study of the structural and quantum conductance properties of atomic-size copper nanowires generated by mechanical stretching. The atomistic evolution was derived from time-resolved electron microscopy observations and molecular dynamics simulations. We have analyzed the quantum transport behavior by means of conductance measurements and theoretical calculations. The results suggest the formation of unusual and highly stable pentagonal Cu nanowire with a diameters of ~ 0.45 nm and ~ 4.5 conductance quanta.

Physical Review Letters, accepted on August 2004.

A 028- 04 "Emergence of prime numbers as the result of evolutionary strategy"

Campos, P. R. A., de Oliveira, V. M., Giro, R., and Galvao, D. S.

We investigate by means of a simple theoretical model the emergence of prime numbers as life cycles, as those seen for some species of cicadas. The cicadas, more precisely the Magicicadas, spend most of their lives below the ground and then emerge and die in a short period of time. The Magicicadas display an uncommon behavior: their emergence is synchronized and these periods are usually prime numbers. In the current work, we develop a spatially extended model at which preys and predators coexist and can change their evolutionary dynamics through the occurrence of mutations. We verified that prime numbers as life cycles emerge as a result of the evolution of the population. Our results seem to be a first step in order to prove that the development of such strategy is selectively advantageous, especially for those organisms that are highly vulnerable to attacks of predators

Physical Review Letters, accepted on August 2004.

A 028- 04 Lock-and-Key Effect in the Surface Diffusion of Large Organic Molecules Probed by STM

R. Otero, F. Hummelink, F. Sato, S. B. Legoas, P. Thosttrup, E. Lagsgaard, I. Stensgaard, D. S. Galvão, and F. Besenbacher

A nano-scale understanding of the complex dynamics of large molecules at surfaces is essential for the bottom-up design of molecular nanostructures. Here we show that we can change the diffusion coefficient of the complex organic molecule known as Violet Lander (VL, $C_{108}H_{104}$) on Cu (110) by two orders of magnitude by using the STM at low temperatures to switch between two adsorption configurations that differ only in the molecular orientation with respect to the substrate lattice. From an interplay with molecular dynamics simulations, we interpret the results within a lock-and-key model similar to the one driving the recognition between biomolecules: the molecule (key) is immobilized only when its orientation is such that the molecular shape fits the atomic lattice of the surface (lock); otherwise the molecule is highly mobile.

Nature Materials, accepted on August 2004.

A 029- 04 Contaminants in suspended golds chains: an ab initio molecular dynamics study

Sergio B. Legoas, Varlei Rodrigues, Daniel Ugarte, and Douglas S. Galvão

Recently, we have proposed that the origin of anomalously long interatomic distances in suspended gold chains could be the result of carbon contamination during sample manipulation (Legoas et al., PRL 88, 076105 (2002)). More recently, however, other works have proposed that hydrogen instead of carbon should be the most probable contaminant. We report ab initio molecular dynamics results for different temperatures considering different possible contaminants. Our results show that at non-zero temperatures (more realistic to simulate the experimental conditions) hydrogen has to be ruled out and carbon atoms remain the best candidate for contamination.

Physical Review Letters, accepted on October 2004.

TRABALHOS PUBLICADOS

P 144 - 04 "Berreman effect in amorphous and crystalline WO₃ thin films"

Trasferetti, B. C., Rouxinol, F. P., Gelamo, R. V., de Moraes, M. A. B., Davanzo, C. U., and de Faria, D. L. A.

Thin films of tungsten oxide deposited by hot filament metal oxide deposition (HFMOD) were thermally annealed up to 800 degreesC and investigated by means of XRD, Raman spectroscopy, and infrared reflection-absorption spectroscopy (IRRAS). As clearly shown by the XRD and Raman spectroscopy data, the deposited films were amorphous and crystallized by thermal annealing. The monoclinic WO₃ phase was formed in all annealed samples. The IRRAS spectra were obtained using the IR beam with p-polarization and an off-normal incidence angle. In this condition, absorptions due to the longitudinal optical (LO) modes (Berreman effect) can be observed in the spectra. Absorptions due to LO modes are not detected by the standard infrared absorption spectroscopy, in which an unpolarized IR beam is used at normal incidence, and thus are not frequently reported in the literature. To analyze the experimental IRRAS spectra, the LO and TO functions were calculated from the transmission spectra of the as-deposited sample, using the Kramers-Kronig transformation and spectral simulation was carried out using the optical constants of both amorphous and crystalline WO₃. For the as-deposited sample, the LO function of the films exhibited a very prominent band at around 950 cm⁻¹ which was also observed in the IRRAS spectra for all samples. For the annealed samples, this band shifted to higher wavenumbers and narrowed and a series of low-intensity bands appeared around 950 cm⁻¹, since crystalline structure changes were induced by thermal treatment. The results signal the applicability of the Berreman effect to the phase characterization of metal-supported WO₃ films

Journal of Physical Chemistry B 108[33], 12333-12338. 2004.

P 145- 04 "Bidecadal cycles in liquid precipitations in Brazil"

Gusev, A. A., Martin, I. M., Mello, M. G. S., Pankov, V., Pugacheva, G., Schuch, N. G., and Spjeldvik, W. N.

Data on liquid precipitation in Brazil for three meteorological stations in Pelotas, Campinas, and Fortaleza from 1849 up to 2000 were considered. The stations span practically the entire latitude range of Brazil. Periodic analysis of the annual rainfall level in Pelotas and in Fortaleza shows a pronounced bidecadal periodicity that extended for about 100-150 years with great variation amplitude reaching of about 90%. Considering a possibility of solar activity signature in this variation we need to assume the existence of a phase change in correlation between rainfall level and solar activity. In this case a high correlation/anti-correlation coefficients with the 22-year solar cycle can be obtained: approximate to 0.8 for Fortaleza and 0.6-0.8 for Pelotas. No correlation was found for Campinas. Correlation with 24-year periodicity independent on solar cycle possibly connected with ocean-atmospheric coupling is approximate to 0.5 in Fortaleza for a total period of 151 years. Short term correlation of rainfall level with crossing a sector boundary of interplanetary magnetic field by Earth during approximate to 50 years of observations was also found. The results appear to have bearing both as a scientific instrument for progress in our understanding of sun-weather connections and, if established, possibilities for long term practical forecasting in the South American region and elsewhere. (C) 2004 COSPAR. Published by Elsevier Ltd. All rights reserved

Solar Variability and Climate Change 34[2], 370-375. 2004.

P 146- 04 "Carbon dioxide laser in dental caries prevention"

Rodrigues, L. K. A., dos Santos, M. N., Pereira, D., Assaf, A. V., and Pardi, V.

Objectives. To describe CO₂ laser characteristics and to review the literature regarding its effects on caries inhibition in enamel and dentin. Another aim of this review is to discuss the effects Of CO₂ laser in combination with fluoride. Data and sources. The literature was searched for review and original research papers relating CO₂ laser characteristics, CO₂ laser effects on enamel and dentin, use Of CO₂ laser in dental caries prevention and the effects Of CO₂ laser in combination with fluoride. The articles have been selected using Medline and manual tracing of references cited in key papers otherwise not elicited. Study selection. Dental studies pertinent to key aspects of review, and those that focus on CO₂ laser. Conclusions. Irradiation of dental enamel by specific wavelengths and fluencies of CO₂ laser alters the hydroxyapatite crystals reducing the acid reactivity of the mineral; CO₂ laser irradiation in combination with fluoride treatment is more effective in inhibiting caries-like lesions than CO₂ laser irradiation or fluoride alone; When laser and fluoride are combined, it is possible to reduce laser energy density and fluoride levels; If this laser technology becomes available at a reasonable cost and the results can be applied in clinical practice, there will be a promising future for this laser in caries prevention. (C) 2004 Elsevier Ltd. All rights reserved

Journal of Dentistry 32[7], 531-540. 2004.

P 147- 04 "Continuous measurement of atom-number moments of a Bose-Einstein condensate by photodetection"

Prataviera, G. A. and de Oliveira, M. C.

We propose a measurement scheme that allows determination of even moments of a Bose-Einstein condensate (BEC) atom number, in a ring cavity, by continuous photodetection of an off-resonant quantized optical field. A fast cavity photocounting process limits the heating of atomic samples with a relatively small number of atoms, being convenient for BECs on microchip scale applications. The measurement back-action introduces a counting-conditioned phase damping, suppressing the condensate typical collapse and revival dynamics

Physical Review A 70[1]. 2004.

P 148- 04 "Correlation exponent K-rho of the one-dimensional Kondo lattice model"

Xavier, J. C. and Miranda, E.

We present results for the correlation exponent K-rho of the Tomonaga-Luttinger liquid description of the one-dimensional Kondo lattice as a function of conduction-electron density and coupling constant. K-rho is obtained from the first derivative of the Fourier transform of the charge-charge correlation function. We also show that the spin correlation function can only be described in this picture if we include logarithmic corrections, a feature that had been previously overlooked. A consistent description of both charge and spin sectors is then obtained. Finally, we show evidence that the spin sector of the dimerized phase at quarter-filling is gapless

Physical Review B 70[7]. 2004.

P 149- 04 "Dependence of H-2/O-2 ratio and GeO2 content on the enhancement of second-order non-linearity related defects in Ge-doped optical fiber preforms"

Cuevas, R. F., Sekiya, E. H., Garcia-Quiroz, A., Da Silva, E. C., and Suzuki, C. K.

In this research, we studied the influence of the process conditions through the H-2/O-2 ratio and the GeO2 content, on the formation of germanium oxygen deficient centers and paramagnetic defects center induced by X-ray irradiation in SiO2:GeO2 glass preform prepared by the vapor-phase axial deposition method. The absorption band at around 5.1 eV, characteristic of germanium oxygen defect center was observed in all glass preform sample absorption spectra. The absorption coefficient increased when the GeO2 concentration increased, however, the absorption was higher in samples prepared with high H-2/O-2 ratio. The electronic spin resonance spectrum profiles suggest that paramagnetic structures, such as, electron trapped centers and positively charged germanium oxygen deficient centers, assigned as Ge(1) and Ge(2), respectively, are induced in all samples after being X-ray irradiated for 1 h. It was found that the concentration of induced paramagnetic centers is linearly proportional to germanium oxygen defect center concentration and that the efficiency in the enhancement of paramagnetic defect centers associated with second-order optical non-linearity increased as H-2/O-2 ratio used in the fabrication process was decreasing. It was concluded that SiO2:GeO2 glass preform with low H-2/O-2 ratio and higher GeO2 content must be prepared for the enhancement of the second-order non-linearity. (C) 2004 Elsevier B.V. All rights reserved

Materials Science and Engineering B-Solid State Materials for Advanced Technology 111[2-3], 135-141. 2004.

P 150- 04 "Emergence of allometric scaling in genealogical trees"

Campos, P. R. A., de Oliveira, V. M., and Maia, L. P.

We investigate the emergence of power-law scalings in genealogical trees. Especially, we study the topological properties of genealogical trees both in the neutral evolution and the selective evolution. In all instances, we observe that the topologies of these trees are well described by a power-law scaling $C-k$ similar to $A(k)(n)$, where $A(k)$ is the number of nodes which are direct or indirect descendants of node k and $C-k = \sum_j A(j)$ where the sum is taken over all nodes that contribute to $A(k)$. This relation is well known in transportation networks as well as in metabolic networks, and it is referred to as allometric scaling. Furthermore, we observe a slight dependence of the scaling exponent η on the intensity of selection

Advances in Complex Systems 7[1], 39-46. 2004.

P 151- 04 "Emergence of prime numbers as the result of evolutionary strategy"

Campos, P. R. A., de Oliveira, V. M., Giro, R., and Galvao, D. S.

We investigate by means of a simple theoretical model the emergence of prime numbers as life cycles, as those seen for some species of cicadas. The cicadas, more precisely the Magicicadas, spend most of their lives below the ground and then emerge and die in a short period of time. The Magicicadas display an uncommon behavior: their emergence is synchronized and these periods are usually prime numbers. In the current work, we develop a spatially extended model at which preys and predators coexist and can change their evolutionary dynamics through the occurrence of mutations. We verified that prime numbers as life cycles emerge as a result of the evolution of the population.

Our results seem to be a first step in order to prove that the development of such strategy is selectively advantageous, especially for those organisms that are highly vulnerable to attacks of predators.

Physical Review Letters 93[9]. 2004.

P 152- 04 "Exciton mixing and internal transitions of neutral magnetoexcitons in quantum wells"

Duque, C. A., Barticevic, Z., Pacheco, M., and Oliveira, L. E.

We present a theoretical investigation, in the effective-mass approximation, of exciton mixing and $1s - 2p(+/-)$ internal transitions of neutral magnetoexcitons in GaAs-Ga $_{1-x}$ Al $_x$ As quantum wells. Theoretical results are obtained by diagonalizing the Kohn-Luttinger Hamiltonian in the presence of an external magnetic field along the growth direction of the quantum well, with mixing of appropriate light- and heavy-hole exciton states taken into account. We first perform the exciton calculations in the diagonal approximation, and take the exciton-envelope wave functions as linear combinations of products of hole and electron quantum-well states with Gaussian functions. Effects of exciton mixing are then calculated within perturbation theory. Theoretical results for the exciton internal transitions from $1s$ -like to $2p(+/-)$ -like magnetoexciton states in GaAs-Ga $_{1-x}$ Al $_x$ As quantum wells, with well widths of 80 Angstrom, 100 Angstrom, 125 Angstrom, 150 Angstrom and 200 Angstrom, are found in overall agreement with optically detected resonance measurements. (C) 2004 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim

Physica Status Solidi B-Basic Research 241[10], 2434-2439. 2004.

P 153- 04 "Franz-Keldysh effect in semiconductor T-wire in applied magnetic field"

Madureira, J. R., Mialle, M. Z., and Degani, M. H.

We have calculated the optical absorption spectra of magnetoexcitons in T-wire semiconductor. It is calculated using the semiconductor Bloch equations in time and real-space domains. The peak and the linewidth of the fundamental exciton transition are investigated as a function of the applied magnetic and static electric field. The latter is applied along the wire axis and induces a broadening in the absorption spectra line, energy shift, and the characteristic Franz-Keldysh oscillations. The exciton binding energy enhances increasing the magnetic field strength

Brazilian Journal of Physics 34[2B], 663-665. 2004.

P 154- 04 "Hysteresis-like behavior in MBANP crystals"

dos Santos, A. O., Avanci, L. H., Cardoso, L. P., Giro, R., Legoas, S. B., Galvao, D. S., and Sherwood, J. N.

In a previous study of (-)-2-(alpha-methylbenzylamino)-5-nitropyridine (MBANP) [Avanci, L.H. et. al., Phys. Rev. B 2000, 61, 65071, X-ray multiple diffraction assessments of the small changes in the unit cell parameters due to a strain produced by (E) over right arrow, together with the resulting variations in the (hkl) peak position and the observed strain, were used to calculate the piezoelectric coefficients of this material. In the present work, we report the extension of these measurements to the determination of the variation of the unit cell parameters of this material under the influence of an externally applied dc electric field. Rocking curves were measured using a SIEMENS P4 single-crystal diffractometer equipped with encoders to ensure omega axis step sizes smaller than 1 mdeg. At the beginning of the experiments, the electric field was increased from zero to 3.2×10^5 V/m and then decreased to zero. It was then reversed in polarity from zero to -3.2×10^5 V/m and returned to zero again to complete the E-cycle. The measured strain versus E-cycle showed an interesting butterfly wing shape hysteresis behavior. Quantum mechanical calculations on isolated MBANP molecules show that the main features of the hysteresis shape can be explained in terms of field-induced changes in the charge profiles and geometry of isolated MBANP molecules

Crystal Growth & Design 4[5], 1079-1081. 2004.

P 155- 04 "Mechanisms of silicon nitride etching by electron cyclotron resonance plasmas using SF6- and NF3-based gas mixtures"

Reyes-Betanzo, C., Moshkalyov, S. A., Ramos, A. C. S., and Swart, J. W.

The results of a study of SiNx, SiO2, and Si etching in a high-density electron cyclotron resonance plasma using mixtures containing SF6, NF3, N-2, O-2, and Ar are presented. Higher selectivities of SiNx, etching over SiO2 (up to similar to 100) were achieved with NF3, while higher selectivities over Si (up to 5-10) were obtained with SF6-based mixtures. Plasma and surface processes responsible for etching are analyzed, and mechanisms of nitride etching in NF3-based plasmas are proposed. (C) 2004 American Vacuum Society

Journal of Vacuum Science & Technology A 22[4], 1513-1518. 2004.

P 156- 04 "Microscopic description of the phase separation process in AlxGayIn1-x-yN quaternary alloys"

Marques, M., Teles, L. K., Scolfaro, L. M. R., Ferreira, L. G., and Leite, J. R.

Ab initio total energy electronic structure calculations are combined with Monte Carlo simulations to study the thermodynamic properties of AlxGayIn1-x-yN quaternary alloys. We provide a microscopic description of the phase separation process by analyzing the thermodynamic behavior of the different atoms with respect to the temperature and cation contents. We obtained, at growth temperatures, the range of compositions for the stable and unstable phases. The presence of Al in InGaIn is proven to "catalyze" the phase separation process for the formation of the In-rich phase. Based on our results, we propose that the ultraviolet emission currently seen in samples containing AlInGaIn quaternaries arises from the matrix of a random alloy, in which composition fluctuations toward InGaIn- and AlGaIn-like alloys formation may be present, and that a coexisting emission in the green-blue region results from the In-rich segregated clusters

Physical Review B 70[7]. 2004.

P 157- 04 "Optical and structural properties of GaAs/GaN quantum wells grown by chemical beam epitaxy"

Martins, M. R., Oliveira, J. B. B., Tabata, A., Laureto, E., Bettini, J., Meneses, E. A., and Carvalho, M. M. G.

In this work we investigated the optical and structural properties of GaAs/GaN quantum wells (CW) grown by Chemical Beam Epitaxy (CBE). The samples were characterized by photoluminescence (PL), photoluminescence excitation (PLE) and transmission electron microscopy (TEM). Simulations of the quantum well potential profiles, using the Van De Walle-Martin model, supplemented by our experimental results, allowed us to associate the interface properties with the growth procedures. We concluded that a thin GaP layer grown at the interface improves its quality and also that the observed broad emission band in the PL spectrum is related to quaternary Ga1-xInxA1-yPy

Brazilian Journal of Physics 34[2B], 620-622. 2004.

P 158- 04 "Optical properties of type-I and II quantum dots"

Iikawa, F., Godoy, M. P. F., Nakaema, M. K. K., Brasil, M. J. S. P., Mialle, M. Z., Degani, M. A., Ribeiro, E., Medeiros-Ribeiro, G., Carvalho, W., and Brum, J. A.

This paper focuses on recent results on the optical properties of self-assembled quantum dots involving type-I InGaAs/GaAs and type-II InP/GaAs interfaces. In the first part, we focus on the InGaAs/GaAs quantum dots, that were used to study the influence of a two-dimensional electron gas on the optical emission of single quantum dots. In the second part, we present the results on type-II InP/GaAs quantum dots. In this system, we observed an experimental evidence indicating that the model used to interpret the blue shift of the type-II quantum well optical emission cannot be applied to type-II quantum dots

Brazilian Journal of Physics 34[2B], 555-559. 2004.

P 159- 04 "Parametric amplifier for midspan phase conjugation with simultaneous compensation of fiber loss and chromatic dispersion at 10 Gb/s"

Boggio, J. M. C., Guimaraes, A., Callegari, F. A., Marconi, J. D., Rocha, M. L., deBarros, M. R. X., and Fragnito, H. L.

We demonstrate simultaneous compensation of loss and chromatic dispersion for 10-Gb/s transmission over 90-km of standard fiber using mid-span phase conjugation with a fiber-optic parametric amplifier that provides 9.4-dB gain over a bandwidth of 17 nm. The observed power penalty is less than 1.5 dB (at BER < 10⁻⁹) relative to back-to-back measurements. (C) 2004 Wiley Periodicals, Inc

Microwave and Optical Technology Letters 42[6], 503-505. 2004.

P 160- 04 "Radiation-induced zero-resistance states: Possible dressed electronic structure effects"

Rivera, P. H. and Schulz, P. A.

Recent results on magnetoresistance in a two-dimensional electron gas under crossed magnetic and microwave fields show a new class of oscillations, suggesting a new kind of zero-resistance states. We consider the problem from the point of view of the electronic structure dressed by photons due to a in-plane linearly polarized ac field. The dressed electronic structure includes opening of radiation induced gaps that have been overlooked so far and could play a role in the recently observed oscillations in the transverse magnetoresistance

Physical Review B 70[7]. 2004.

P 161-04 "Temperature-dependent transport of correlated disordered electrons: Elastic vs. inelastic scattering"

Aguiar, M. C. O., Miranda, E., Dobrosavljevic, V., Abrahams, E., and Kotliar, G.

Temperature-dependent transport of disordered electronic systems is examined in the presence of strong correlations. In contrast to what is assumed in Fermi-liquid approaches, finite-temperature behavior in this regime proves largely dominated by inelastic electron-electron scattering. This conclusion is valid in the strong-coupling limit, where the disorder, the correlations and the Fermi energy are all comparable, as in many materials near the metal-insulator transition

Europhysics Letters 67[2], 226-232. 2004.

P 162-04 "Transport and magnetotransport transition of thin Co films grown on Si"

de Carvalho, H. B., Brasil, M. J. S. P., Denardin, J. C., and Knobel, M.

Thin Co films deposited onto p-type Si substrates show a marked transition on their transport properties for temperatures around 250 K. For temperatures higher than 250 K, the planar conduction measured in our samples changes from electronic to hole-like and the film resistance undergoes a clear drop. The transition is also observed by a marked change of the magnetotransport properties of the studied films. This effect can be explained by a conduction channel switching from the upper metallic film to the Si hole inversion layer as we increase the sample temperature. We show that this channel switching may be controlled by applying an external bias voltage to the structure. (C) 2004 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim

Physica Status Solidi A-Applied Research 201[10], 2361-2365. 2004.

P 163-04 "XPS analysis of electronic density of iron tetraazamacrocyclic through Fe 2p binding energies on the 3-imidazolilpropyl-modified surface of oxidized n-Si(100)"

Andresa, J. S., Moreira, L. M., Magalhaes, J. L., Gonzalez, E. P., Landers, R., and Rodrigues-Filho, U. P.

This paper describes the preparation of metallo-organic thin films of [FeTIM(CH₃CN)₂](2+) complex, where TIM stands for 2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene on oxidized silicon wafer, SiO₂/Si, previously treated with 3-imidazolilpropyltrimethoxysilane, 3-IPTS. X-ray photoemission lines of Fe2p were used to probe the iron chemical environment in the physically and chemically adsorbed macrocycle complexes. As FeTIM can bind CO, NO or N-heterocycle, a built-on Si wafer sensor device could be envisaged for these molecules. Copyright (C) 2004 John Wiley Sons, Ltd

Surface and Interface Analysis 36[8], 1214-1217. 2004.

Abstracta

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