

## Symposium D

POSTER SESSION PD1 - WEDNESDAY, OCTOBER 11

### D502 - SIMULATION OF UV-VIS ABSORPTION SPECTRA OF PANI/PVS FILMS USED TO ENHANCE POLYMERIC ELECTROLUMINESCENT DEVICES PERFORMANCE

Adnei Melges de Andrade (EPUSP) and John Paul Hempel Lima (EPUSP)

In this work, artificial neural networks were used to simulate the UV-Vis absorption spectra of PANI/PVS films deposited by the layer-by-layer technique with different number of bilayers and doping levels. One hidden-layer Multilayer Perceptron architecture was used and it is shown that with 150 neurons it presented the lowest Mean Square Error. It is also shown a comparison between experimental and simulated spectra. We propose this approach to be used in the determination of thin-film design so as to not overlap the device emission spectra, thus enhancing general device performance.

### D503 - PHOTOLUMINESCENCE INTENSITY ENHANCEMENT IN POLY(3-THIOPHENEACETIC ACID) FILMS INDUCED BY LASER

Ernesto Chaves Pereira de Souza (UFSCar), Yara Galvão Gobato (UFSCar) and Franciele de Oliveira Freitas Bergamaski (UFSCar)

In this work, we report an enhancement of photoluminescence (PL) intensity when Poly(3-Thiopheneacetic acid) (PTAA) films were excited under low laser intensity. The polymer was prepared by the chemical oxidation of the monomer using  $\text{FeCl}_3$  as oxidant agent in  $\text{CHCl}_3$  solution under  $\text{N}_2$  flux. The origin of PL enhancement is still under investigation but it may be associated to the chain shortening process and formation of an energy profile that extends and migrates into the film and enables spectral diffusion of excited carriers to a non-degraded PTAA segments by Förster energy transfer.

### D504 - CHARACTERISTIC PHOTOLUMINESCENCE ON ANODIC OXIDE ZIRCONIUM

Francisco E. G. Guimarães (USP-IFSC), Francisco Trivinho Strixino (UFSCar) and Ernesto Chaves Pereira (UFSCar)

It was investigated the photoluminescence of  $\text{ZrO}_2/\text{Zr}$  anodic oxide films growth with constant current density. Films with different thickness (different charge density) showed different photoluminescence intensity. During the anodization the voltage-time curve showed a characteristic voltage oscillation in the dielectric breakdown region tuned with the increasing of the integrated photoluminescence. It was proposed a photoluminescence mechanism related to the oxygen vacancy and oxo-phosphors ions originated from defects during film formation.

### D506 - EVALUATION OF PLANAR WAVEGUIDES CONTAINING CEIII AND TBIII IONS PREPARED BY THE SOL-GEL METHOD

Kátia Jorge Ciuffi (Universidade de Franca), Eduardo José Nassar (Universidade de Franca), Lucas Alonso Rocha (Unesp-Araraquara), Bruno Leonardo Caetano (Universidade de Franca), Eduardo Ferreira Molina (Unesp-Araraquara) and Paulo Sergio Calefi (Universidade de Franca)

In this study, we examined the luminescence of Tb III rare-earth in thin films deposited by dip-coating on glass substrate. The potential applications of this material as a planar waveguide were evaluated. The hydrolytic sol-gel technique was used in the preparation of the titanium solution. The films' thickness and refractive index were characterized by m-line spectroscopy.

### D508 - ORGANIC PHOTOVOLTAIC DEVICES BASED ON POLYTHIOPHENE ELECTROCHEMICALLY SYNTHETIZED/FULLERENE BYLAYERS

Fabiano Thomazi (UFPR), Regina M. Q. Mello (UFPR), Jan C. Hummelen (University of Groninge), Lucimara Stolz Roman (UFPR), Lilitiana Micaroni (UFPR), Rogério Valaski (UFPR) and Carla Daniele Canestraro (UFPR)

Polythiophene has promising features to be used in optoelectronic devices and the fullerene derivatives utilization is able to improve the photodetector device efficiency, by their high electron affinity. Furthermore the electrochemical synthesis is an easier way to produce organic films, increasing the potential of the polythiophene/fullerene devices for technological applications.

### D509 - SYNTHESIS AND OPTICAL PROPERTIES OF COPOLYMERS OF ALKYL- AND AZO-THIOPHENES

Marcos R. Cardoso (IFSC), Lígia M.M. Costa (IFSC), Vanessa C. Gonçalves (IFSC), Cléber R. Mendonça (IFSC) and Débora T. Balogh (IFSC)

Four copolymers with different proportions of alkyl- and azo-thiophene units were synthesized. All of them showed thermo- and solvatochromic properties, which were not influenced by the azothiophene content. Optical storage could be observed only in copolymers with high content of azothiophene units (more than ca. 10 % in mol). These results are promising to improve the properties of polyazothiophenes and to design thermo- and solvatochromic sensors and optical storage devices that can combine the optical induced orientation and the properties of conjugated polymers.

### D510 - CONDUCTING POLYMER-SILICON HETEROJUNCTION: A NEW ULTRAVIOLET PHOTODETECTOR

I Pepe Pepe (UFBA), E F da Silva Jr (ufpe), W M de Azevedo (ufpe), E A Vasconcelos (ufpe), J R Cárdenas (ufpe), S S Ribeiro (UFBA), K A Silva (UFBA) and A F da Silva (UFBA)

The development of UV photodetectors has driven numerous applications in the defense, commercial, and scientific areas. Recently we reported the development of high quality silicon/polyaniline heterojunctions. Since polyaniline presented optical response in the UV region we investigated the heterojunction response as a UV detector. The electrical characteristics and UV efficiency for a typical device present excellent reproducibility and high rectification ratio. The results show that the photon response can be used as a broad band photon detector, with good sensitivity (enhanced 200 %), especially in the UV region 2.0 - 3.5 eV, when compared to commercial all-silicon UV diodes.

### D511 - SINGLE-LAYER ORGANIC PHOTOVOLTAIC DEVICES WITH UNUSUALLY HIGH OPEN-CIRCUIT VOLTAGE

Marlus Koehler (UFPR), Liliana Miraconi (UFPR), Regina Mello (UFPR), Rodolfo Patyk (UFPR), Elinton Luiz Leguenza (UnicenP/UFPR) and Ivo Alexandre Hümmelgen (UFPR)

We report the preparation of polybithiophene (PBT) electrochemically deposited on top of fluorine-doped tin oxide (FTO) substrates, for single organic-semiconductor-layer photovoltaic devices. The PBT films for our devices were prepared by galvanostatic deposition on glass covered with fluorine-doped tin-oxide. They were characterized measuring the current versus voltage I(V) characteristics under AM 1.5 spectral distribution. An unusual observed feature in these devices is the high open-circuit-voltage, of the order of 2.2 V at irradiance of 6.6 W.m<sup>-2</sup>.

### D512 - ROOM-TEMPERATURE PHOTOLUMINESCENCE IN STRUCTURALLY DISORDERED SrWO<sub>4</sub>

Elson Longo (Unesp), José Arana Varela (Unesp), Paulo Sergio Pizani (UFSCar), Marcia Escotte (UFSCar), Edson Roberto Leite (UFSCar), Luiz Ferreira Lima Junior (UFSCar), Marcos Anicete Santos (UFSCar) and Francini Cristiani Picon (UFSCar)

Intense and broad visible PL band in structurally disordered SrWO<sub>4</sub> compounds was observed at room temperature. The polycrystalline SrWO<sub>4</sub> samples prepared by the polymeric precursor method at different temperatures of annealing were structurally characterized by XRD and FT-Raman spectroscopy. Quantum-mechanical calculations showed that the local disorder in the cluster of the network modifiers Sr has a very important role in the charge transfer. The results indicated that the generation of the intense visible PL band can be related to short-range order-disorder degree in the scheelite structure.

### D513 - INVESTIGATION OF DYE DOPING INFLUENCE ON SPIN DEPENDENT EXCITON FORMATION BY ELECTRICALLY DETECTED MAGNETIC RESONANCE

Frank Nüesch (EMPA), Fernando Araujo Castro (DFM-FFCLRP-USP), Jorge Antonio Gomez-Luna (DFM-FFCLRP-USP), Libero Zuppiroli (EPFL) and Carlos F.O Graeff (DFM-FFCLRP-USP)

The effect of dye doping on spin dependent exciton formation in aluminum (III) 8-hydroxyquinoline (Alq<sub>3</sub>) based OLED was studied using Electrically Detected Magnetic Resonance (EDMR). EDMR measurements of these devices, undoped and doped, show significant difference in the g-factor and in the peak to peak magnetic field amplitude.

### D514 - CHARACTERIZATION OF GERMANATE THIN FILMS

Sebastião Gomes Santos Filho (USP), Ronaldo Domingues Mansano (USP), Rodrigo Savio Pessoa (ITA), Marcos Massi (ITA), Luciana Reyes Kassab (FATEC-SP, USP) and Vanessa Duarte Cacho (USP)

This work presents thin films of GeO<sub>2</sub>-PbO deposited by reactive sputtering for applications with waveguides. GeO<sub>2</sub>-PbO targets were prepared melting the powders in alumina crucible. Thin films were deposited by pure Ar plasma and RF power, using different deposition time. Some structural characteristics of the deposited films were determined: thickness, refractive index and roughness, using profilometry, ellipsometry and Atomic Force

Microscopy techniques. Rutherford Backscattering Spectroscopy (RBS) analyses were employed for the determination of the chemical composition of the films.

### D516 - SYNTHESIS OF LIQUID-CRYSTALLINE MONOMERS DERIVED FROM AN AZO-DYE

Oswaldo Novais de Oliveira Jr. (IFSC-USP), Débora Terezia Balogh (IFSC-USP) and Thiago Francisco Costa Carpes Borges (IFSC-USP)

Two liquid-crystalline monomers were synthesized from an azodye, 4-hydroxy-2'-methoxy-4'-nitroazobenzene. The chemical structure of the monomers and the intermediate products were determined by UV-Vis and FTIR spectroscopy and proton nuclear magnetic resonance (1H-NMR). These monomers will be used in the synthesis of azopolymers for preparation of thin and ultrathin films, and then used in optical storage and surface relief grating experiments.

### D518 - ENERGY EXCHANGE MECHANISM IN P3HT/BEHP-PPV POLYMERIC BLENDS

Luiz Alberto Cury (UFMG), Marcelo Valadares (UFMG), Hállen Daniel Rezende Calado (UFMG) and Paulo Sérgio Soares Guimarães (UFMG)

We present photoluminescence and absorption studies of P3HT/BEHP-PPV polymeric blends at different temperatures. The PL spectra dependence on the excitation laser power and on the P3HT concentration in the blends demonstrates experimentally the existence of an energy exchange mechanism between the molecules of the two polymers. A good theoretical fit of the 75% P3HT PL spectrum, based on a Franck-Condon method, is done by using only the P3HT parameters, which clearly indicates that a transfer mechanism is occurring from the BEHP-PPV to P3HT molecules.

### D519 - INCORPORATION OF Gd<sup>3+</sup> CoDOPED WITH Tm<sup>3+</sup> IN AN ALUMINUM-YTTRIUM OXIDE MATRIX

Eduardo José Nassar (UNIFRAN), Alexandre Cestari (UNIFRAN), Lilian Rodrigues Avila (UNIFRAN), Evelisy Cristina Oliveira Nassor (UNIFRAN), Paula Fabiana dos Santos Pereira (UNIFRAN), Kátia Jorge Ciuffi (UNIFRAN), Paulo Sérgio Calefi (UNIFRAN) and Liziane Marçal Silva (UNIFRAN)

Tm<sup>3+</sup>-doped Yttrium Aluminum Garnet (Tm:YAG) is a very promising optical material. This paper reports on the synthesis of Gd codoped with Tm in a polycrystalline YAG powder matrix by the nonhydrolytic sol-gel method. The sample was heat-treated at different temperatures. The thermal behavior, phase transformation, composition and optical properties of the polycrystalline sample were analyzed by TG/DTA, XRD and Photoluminescence (PL). These new materials doped with different active elements could be potential candidates as laser materials for solid-state lasers. CNPq, Capes and Fapesp.

### D520 - NANOSTRUCTURING SiO<sub>2</sub>/SI INTERFACES WITH METALLIC NANO-ISLANDS

Paulo Fernando Papaleo Fichtner (Escola de Engenharia), João Marcelo Jordão Lopes (Instituto de Física), Felipe Kremer (Instituto de Física) and Fernando Claudio Zawislak (Instituto de Física)

In the present contribution we present more systematical results on the

formation of dense arrays of epitaxial Sn or Pb nano-islands at SiO<sub>2</sub>/Si(001) interfaces obtained by ion implantation followed by thermal annealings. The ionic species are implanted within the silica films and the islands are formed during thermal treatments at distinct temperatures T and times t. We demonstrate that the Sn or Pb diffusion and accumulation at the SiO<sub>2</sub>/Si interface depends not only on the annealing temperature and time but also on the atmosphere (N<sub>2</sub> or vacuum) and implanted fluence.

#### **D521 - LUMINESCENCE OF SrAl<sub>2</sub>O<sub>4</sub>:Cr<sup>3+</sup>**

Raul José da Silva Camara Mauricio da Fonseca (IF - UERJ), Raimundo Nonato da Silveira Jr. (IF - UERJ), Alexandre Resende Camara (IF - UERJ), Ada Lopez (CBPF, UERJ), Elisa Baggio Saitovitch (CBPF) and Mariana Giffoni da Silva (UERJ, CBPF)

Samples of SrAl<sub>2</sub>O<sub>4</sub> and SrAl<sub>2</sub>O<sub>4</sub>:Cr<sup>3+</sup> were prepared by mixing the powder materials SrCO<sub>3</sub>, Al<sub>2</sub>O<sub>3</sub> and Cr<sub>2</sub>O<sub>3</sub>. The crystal structure of the undoped and doped samples were determined from conventional X-ray powder diffraction data using direct methods. Luminescence of Cr<sup>3+</sup> ions in this host is investigated by excitation and emission spectroscopy at room and low temperatures. The observed optical transitions are assigned by using crystal-field theory. Finally, from the position of the optical structures, the usual spectroscopic parameters (Dq, B and C) are evaluated for Cr<sup>3+</sup> in octahedral sites.

#### **D525 - OPTICAL AND ELECTRICAL CHARACTERISTICS OF NANOCRYSTALLINE GaMnAs (/:H) FILMS PREPARED BY RF MAGNETRON SPUTTERING**

Pascoal Pagliuso (UNICAMP), Carlos Rettori (UNICAMP), Wellington Iwamoto (UNICAMP), Luis Fernando da Silva (UNESP), Wangner Barbosa da Costa (UNESP), André Luis de Jesus Pereira (UNESP), Marcel Henrique Arraya Aviles (UNESP) and Jose Humberto Dias da Silva (UNESP)

We describe the optical, electrical and magnetic characteristics of nanocrystalline Ga<sub>1-x</sub>MxAs films prepared by RF magnetron sputtering as a function of the Mn content and hydrogenation. The possible relations between the conductivity characteristics of the materials, and its optical, structural, and magnetic properties are discussed.

#### **D526 - TRANSPORT AND STRUCTURAL PROPERTIES OF SNTe FILMS GROWN BY MOLECULAR BEAM EPITAXY**

Eduardo Abramof (INPE), Valmir Antonio Chitta (USP), Paulo Henrique de Oliveira Rappl (INPE), Úrsula Andréia Mengui (INPE), Antonio Yukio Ueta (INPE) and Nei F Oliveira. Jr (USP)

SnTe epilayers grown by molecular beam epitaxy on (111) BaF<sub>2</sub> have been structurally characterized by HRXRD and AFM, and the electrical properties investigated using temperature dependent Hall effect. The magneto-resistance of the samples has been measured for magnetic fields up to 7 T and temperatures varying from 1.5 up to 30 K. Analyzing the dependence of the magneto-resistance on the magnetic field, we can determine the effect of the disorder, which depends on the thickness of the samples and on their magneto-transport properties.

#### **D527 - SILICON MICRO-STADIUM, DISK AND ELLIPSE STRUCTURES WITH EMISSION AT 1550NM**

Newton C. Frateschi (CCS/IFGW - UNICAMP) and David Figueira (CCS/IFGW - UNICAMP)

In this work we present our results on microdisks, microellipses and microstadium resonators based on a-Si:H and a-SiO<sub>x</sub>:H layers sandwiched in air and SiO<sub>2</sub>, obtained by wet oxidation of Si substrates. RBS results show erbium concentrations of 1.0x10<sup>20</sup> atoms/cm<sup>3</sup> that is responsible for large photoluminescence emission at 1550 nm. Also, we will describe the photoluminescence dependence on annealing temperature and oxygen content. Finally, we will be presenting our results on resonant structures focused on directional and spectral properties of the emission.

#### **D531 - EFFECT OF TUNGSTEN INCORPORATION ON THE OPTICAL PROPERTIES OF PHOSPHATE GLASSES**

Sidney Ribeiro (UNESP), Marcelo Nalin (UNESP), Gaël Yves Poirier (UNESP) and Younes Messaddeq (UNESP)

Tungstate fluorophosphate glasses were studied in the NaPO<sub>3</sub>-BaF<sub>2</sub>-WO<sub>3</sub> system. Special oxidizing agents must be used for the most WO<sub>3</sub> concentrated samples in order to obtain large vitreous samples with good optical quality. Structural variations of the vitreous network were studied in function of the composition and are related with several specific optical properties such as non linear optical absorption and photosensitivity under visible laser exposure.

#### **D532 - PHOTOLUMINESCENCE OF Ca(MoW)O<sub>4</sub> THIN FILMS**

Elson Longo (UNESP), Iedo Alves Sousa (UNESP), Miryan Rincon Joya (UFSCAR), Maria Teresa Fabbro (UNESP), José Waldo Espinosa (UFPPB), Adaci Batista Campos (UNESP) and José Arana Varela (UNESP)

This work reports on the structural and photoluminescence properties of Ca(Mo<sub>0.8</sub>W<sub>0.2</sub>)O<sub>4</sub> films produced by the polymeric precursor method. The structure, have been investigated by DRX, AFM and PL. The films partial crystalline show spherical morphology however whit different size of particles and a stronger intensity photoluminescence at room temperature. The scheelites CaMoO<sub>4</sub> and CaWO<sub>4</sub> are very important materials by the extensive applications of their luminescence property, more attention because of its important use as laser host materials, scintillator, detecting x-rays and in medical applications.

#### **D533 - STUDY OF THE PHOTOACTIVATED ELECTRONIC TRANSFERENCE FROM RHODAMINE B TO TiO<sub>2</sub> - Al<sub>2</sub>O<sub>3</sub> ENCAPSULATED NANOPARTICLES**

Elson Longo (LIEC/UNESP - Araraquara), José Arana Varela (LIEC/UNESP - Araraquara), Tania Regina Giralardi (LIEC/UFSCar), Caue Ribeiro (LIEC/UFSCar), Rafael Libanori (LIEC/UFSCar) and Edson Roberto Leite (LIEC/UFSCar)

The photocatalysis of degradation of Rhodamine B dye in TiO<sub>2</sub> and TiO<sub>2</sub> - Al<sub>2</sub>O<sub>3</sub> encapsulated was studied by means of photoluminescence and UV-Vis spectroscopy. A investigation about tunnelling effects and electronic recombination was done by changing the Al<sub>2</sub>O<sub>3</sub> concentration in the samples.

**D534 - ELECTRICAL AND OPTICAL PROPERTIES OF CARBON NANOTUBES/POLYMER IN A POROUS BILAYER STRUCTURE**

Aldo J.G. Zarbin (UFPR), Lucimara Stolz Roman (UFPR), Mariane C. Shnitzler (UFPR) and Carla Daniele Canestraro (UFPR)

In this work we report the electrical and optical characteristics of devices constructed in a porous bilayer structure. We used carbon nanotubes and Poly 3-(hexyl thiophene) (P3HT) in order to improve the photocurrent by the excitons dissociation in the heterojunction aligned carbon nanotubes/polymer and the charge transport to the electrodes.

**D536 - MORPHOLOGICAL AND ELECTRICAL CHARACTERIZATION OF ORGANIC DEVICES BASED ON BURITI OIL:POLYSTYRENE BLENDS**

Artemis Marti Ceschin (Dep. Eng. Elétrica - UnB), Rafel Fontes Souto (Dep. Eng. Elétrica UnB), Maria José Araujo Sales (I. Química - UnB), Jussara Angélica Durães (I. Química - UnB) and Carla D Canestraro (Dep. Física - UFPR)

Buriti oil blended with polystyrene (PS) was used as active layer in electronic devices. Such devices were characterized by AFM and I-V measurements. The results of AFM images were correlated with typical I-V curves that show hysteretic behavior. This effect might be used for producing memory devices, oscillators and switches.

**D537 - PREPARATION OF NANOCRYSTALLINE Ga<sub>(1-x)</sub>Mn<sub>(x)</sub>As FILMS BY RF MAGNETRON SPUTTERING**

J. Humberto Dias da Silva (FC - Unesp - Bauru), Luis Fernando da Silva (FC - Unesp - Bauru) and André Luis de Jesus Pereira (FC- Unesp - Bauru)

In this work we describe the preparation and structural properties of the Ga<sub>(1-x)</sub>Mn<sub>(x)</sub>As films with different concentration of Mn grown using a system of rf magnetron sputtering. The main results of Energy Dispersive X-ray and X-Ray Diffraction for the films proves the versatility of this technique to effectively incorporate Mn by co-sputtering in the structure of the GaAs without any indication of Mn segregation in concentrations up to x=0.2. The films presented good optical and structural properties: low macroscopic defect density and good adherence to the substrates used.

**D538 - STUDY OF AZOPOLYMERS/ POLY(AMIDE-IMIDE) BLENDS FOR APPLICATIONS IN**

Cléber Renato Mendonça (IFSC), Antônio José Félix Carvalho (IFSC), Marcos Roberto Cardoso (IFSC), Lucinéia Ferreira Ceridório (IFSC) and Débora Teresia Balogh (IFSC)

Aiming to applications in optical storage using flexible self-standing films, blends of Poly(amide-imide)(PAI) with two different azopolymers (PMMA-DR13, Poly-S119) have been prepared in the proportion of 95% of PAI and 5% of azopolymers. Miscibility studies of these blends were carried by UV-Vis, FTIR spectroscopies and by DSC measurements.

**D539 - TRANSLUCENT HEMATITE FILMS DEPOSITED ON CONDUCTING FLUORINE DOPED TIN OXIDE (FTO) GLASS**

Viviane Cristina Albarici (UFSCar), Kirian Pimenta Lopes (UFSCar), Elson Longo (UNESP) and Edson Roberto Leite (UFSCar)

In this work, we present the preparation method for multilayer ultrathin films. The hematite films deposited on FTO substrates were obtained by immersion of the substrates into a Fe-polymeric resin for different times. This is an adsorption process where the polymeric resin bonds electrostatically to the substrate. The thickness of the layers can be controlled by adjusting number of immersion and time of deposition. The films were characterized by FE-SEM, UV-visible and XRD. The results showed the formation of hematite phase on FTO substrate.

**D540 - SOL-GEL TiO<sub>2</sub> THIN FILMS SENSITIZED WITH THE BLACKBERRY PIGMENT CYANIDIN**

Eduardo José Nassar (Unifran), Paulo Sergio Calefi (Unifran), Alex Marçal (Unifran), Emerson Henrique de Faria (Unifran) and Katia Jorge Ciuffi (Unifran)

This paper reports on a study of TiO<sub>2</sub>/cyanidin thin films obtained by the sol-gel route and applied as coating on glass by the dip-coating method. The grafting of the dye onto TiO<sub>2</sub> surface was characterized UV-visible spectrophotometry, Raman and FT-IR spectroscopy. The films' thicknesses were measured by profilometry while scanning electron microscopy (SEM) was used to analyze the films' morphology.

**D541 - ORGANIC OPTOELECTRONIC DEVICE BASED ON PHACE MOLECULE FILM ON FTO SUBSTRATE**

Wagner Eduardo Silva (DQF - UFPE), Marcos Allan Leite Reis (PPGEE - UFPA), Gustavo Baldissera (PIPE - UFPR), Lucimara Stolz Roman (DF - UFPR) and Jordan Del Nero (PPGEE - UFPA)

Experimental and theoretical analysis are made and calculated of the organic semiconductor molecule 2,3,4,5-Tetraphenyl-1-phenylethynyl-cyclopenta-2,4-dienol (PHACE). The experimental analyses are made in thin films deposited by spin-coating from solution and the theoretical analysis used the Hartree-Fock derivative methodology (AM1). The theoretical works shown a tunnel effect. The experimental results presented the devices working as photodetector and LEDs.

**D543 - AFTERGLOW PHOSPHORESCENCE OF Ba<sub>4</sub>Al<sub>10</sub>O<sub>19</sub>: Eu<sup>2+</sup>;Dy<sup>3+</sup> PREPARED IN AIR**

Maria C.F.C. Felinto (USP), Ercules Souza Teotonio (USP), Alessandra Souza Maia (USP), Roberval Stefani (USP) and Hermi Felinto Brito (USP)

The afterglow phosphorescence or Persistent Luminescence are a long phosphorescence lasting at room temperature after stopped the irradiation. According with this mechanism the electron is trapped by Dy<sup>3+</sup> to form Dy<sup>2+</sup>, a ground state located 0.66 eV below the bottom of the conduction band. Persistent luminescence is caused by the thermally activated release of the electron from Dy<sup>2+</sup> back to the conduction band with subsequent recombination with Eu<sup>3+</sup> leading to 5d-4f emission. This paper reports the preparation in air of the compound Ba<sub>4</sub>Al<sub>10</sub>O<sub>19</sub>: Eu<sup>2+</sup>;Dy<sup>3+</sup> that presents afterglow phosphorescence

**D545 - LUMINESCENCE EFFICIENCY ENHANCEMENT THROUGH FÖRSTER MIGRATION SUPPRESSION IN**

## CONJUGATED POLYMERS

Roberto Mendonça Faria (IFSC - USP), Francisco Eduardo Gontijo Guimarães (IFSC - USP), Francisco Carlos Barbosa Maia (IFSC - USP) and Osvaldo Novais de Oliveira (IFSC - USP)

In this work, we seek the understanding of intermediary process that domain the Energy Transfer and provide the optical properties of conjugated polymers, specifically poly(p-phenylene vinylene) or PPV, for to find the ways to employ the efficiency of emission and the life time of OLEDs. With engineering of molecular techniques we accomplish the Interchain separation, through the PDAC molecules, and the Intrachain separation through DBS incorporation and through the external imposed order of polymeric web, we obtain how intermediary events, Interchain and Intrachain Energy Transfer, influence the absorption and the final emission in the PPV.

## D546 - HGI2 CRYSTALS OBTAINED BY SOLVENT EVAPORATION

Marcelo Mulato (FFCLRP-USP) and Julio Cesar Ugucioni (FFCLRP-USP)

HgI<sub>2</sub> is a semiconductor that has been studied to build ionizing radiation detectors in the last decades because it shows important properties like wide band-gap, high atomic number and density. Crystals were obtained by the solvent evaporation technique with ethanol. The evaporation rate was controlled with a cover of PVC-paper. Three different conditions are tested: at room temperature in the dark and in presence of ambient light, and at 40°C in controlled oven. The solvent evaporation rate and structural and electrical characterization of the final crystals are the focus of this work.

## D547 - POLY (N- VINYL CARBAZOLE) CONDUCTOR TRAILS FOR MICROELECTRONICS DEVICES

Wang Shu Hui (Universidade de São Paulo), Shirley Possidonio (Universidade de São Paulo), Tais Assis Moreira (Universidade de São Paulo) and Roberto Koji Onmori (Universidade de São Paulo)

The main objective of this work is the preparation of PVK conductor trails suitable for application in the development of polymeric microelectronic device. PVK was synthesized by living free radical polymerization process and was characterized by NMR, FTIR and GPC. PVK thin films were obtained by polymer solution spin coating and evaporation. The conventional photolithography process was applied and followed by exposition to the O<sub>2</sub> plasma etching in order to develop the electronic circuit. The corrosion process under different conditions is being monitored for materials in plasma process.

## D548 - PHOTOLUMINESCENT SILICON-RICH SILICON OXYNITRIDE ALLOYS GROWN BY PECVD

Ricardo Aparecido (EPUSP), Denise Criado (EPUSP), Márcia Ribeiro (EPUSP) and Inés Pereyra (EPUSP)

Rich silicon oxynitride films have been produced by PECVD technique. The films present luminescent properties in the visible spectral region. The films are characterized by Rutherford back-scattering (RBS), Raman spectroscopy, x-ray absorption near edge spectroscopy (XANES) and photoluminescence. The interest in this study aims at understanding the involved phenomena of luminescent emission.

## D549 - MOLECULAR ORIENTATION IN SELF-ASSEMBLED AZO-POLYMER THIN FILMS STUDIED BY SECOND HARMONIC GENERATION

Sérgio Carlos Zilio (IFSC-USP), Cleber Renato Mendonça (IFSC-USP), Fábio J. da Silva Lopes (IFSC-USP) and Paulo Barbeitas Miranda (IFSC-USP)

We have used Optical Second Harmonic Generation to study the molecular orientation of Layer-by-Layer polyelectrolyte films containing azochromophores as side groups on a glass substrate. The results demonstrate that there is a preferential orientation of azochromophores that lead to a significant optical nonlinearity. However, the signal strength and its anisotropy are not homogeneous throughout the sample indicating the presence of orientational domains. Analyzing the SHG signal as a function of the polarizations, a few parameters of the chromophore orientational distribution can be deduced.

## POSTER SESSION PD2 - THURSDAY, 12 OCTOBER

## D550 - SPECTROSCOPIC AND PHOTOCATALYTIC PROPERTIES OF CdS/SiO<sub>2</sub> AND CdS/SiO<sub>2</sub>-TiO<sub>2</sub> NANOCOMPOSITES

Paula Corio (USP), Vilma Costa (UFMG), Maria Terezinha Caruso Sansiviero (UFMG), Viviane Soares (UFMG) and Maria L De Souza (USP)

We report the preparation of CdS/SiO<sub>2</sub> and CdS/TiO<sub>2</sub>-SiO<sub>2</sub> composites by sol-gel process using tetraethoxysilane and titanium isopropoxide as precursors. Nanometer sized crystallites of CdS were incorporated into the matrices by complex formation with thiourea. The composites were studied by infrared, UV-visible and Raman spectroscopy, X-ray diffraction, fluorescence and preliminary photocatalytic activity tests. The coupling of semiconductors with appropriate energy levels can produce a more efficient photocatalyst via better charge separation.

## D551 - OPTICAL AND STRUCTURAL PROPERTIES OF PBi2 THIN FILMS

F Iikawa (IFGW-UNICAMP), R A Ando, J F Condeles (FFCLRP-USP) and Marcelo Mulato (FFCLRP-USP)

Lead iodide (PbI<sub>2</sub>) is a promising semiconductor candidate for room temperature X-ray detector for digital medical imaging and has attracted special attention in the past decades. Spray pyrolysis was used as an alternative method for deposition of polycrystalline PbI<sub>2</sub>. using n,n-dimethylformamida (DMF) as solvent. Photoluminescence, Raman scattering, X-ray diffraction and Scanning electron microscopy were used to study the thin films. Samples with a thickness of approximately 60µm were obtained. At a higher deposition temperature the material presents better optical response and is more stable.

## D552 - RESPONSE OF L-ALANINE AND 2-METHYLANINE MINIDOSIMETERS FOR K-BAND (24 GHZ) EPR DOSIMETRY

Oswaldo Baffa (USP-RP), Carlos Frederico O. Graeff (USP-RP) and Felipe Chen (USP-RP)

Electron paramagnetic resonance (EPR) spectroscopy has been used for

many years to study and characterize different types of materials, ranging from inorganic to biological materials interest. It is due to this wide variety of materials that this technique can study that, it has found diverse applications.

**D553 - NONLINEAR FILMS WITH NOVEL BENZAZOLE MOLECULES FOR PHOTONIC DEVICE APPLICATIONS**

Ricardo Rego Bordalo Correia (UFRGS), Franco Valduga de Almeida Camargo (UFRGS), Fabiano Severo Rodembusch (UFRGS), Tiago Buckup (UFRGS), Marcelo Barbalho Pereira (UFRGS), Valter Stefani (UFRGS) and Flavio Horowitz (UFRGS)

PMMA films fabricated by spin coating and doped with nonlinear molecules are investigated - two commercial (DRI and PNA) and two novel benzazole derivatives with thermal stability up to 270 °C (LEA and LEN). Molecular alignment is performed by application of a dc-electrical poling field. Second-harmonic is generated and recorded under incidence angle variation. With this curve and film thickness, the nonlinear coefficient  $d_{33}$  is estimated, and the hyperpolarizability is calculated. Consistent results are obtained for PNA, LEA and LEN, but not for DRI, probably caused by its S0-S1 transition.

**D555 - NANOPOROSITY AND DENSITY RELATIONSHIP IN NANOSTRUCTURED SILICA**

Edmilton Gusken (UNICAMP), Rodrigo Guevara Tomazi (UNICAMP), Danilo Leite Dalmon (UNICAMP) and Carlos Kenichi Suzuki (UNICAMP)

Optical fibers and special lenses are some examples of photonics devices that may have new and better characteristics when its nanostructured phase is controlled. The nanostructured silica is an intermediate stage in some fabrication process such as VAD (vapor-phase axial deposition), its nanoporosity and density are controllable by the process parameters. This research presents an empirical relationship between nanoporosity and density (obtained by X-ray absorption and BET) controlled by heat treatment and pressing. The results show that different parameters imply different relationships.

**D556 - MICROSTRUCTURAL FIBERS BASED ON ARSENIC SULFIDE GLASS**

Sidney L. Ribeiro (IQ UNESP), Sandra H. Messaddeq (IQ UNESP), Igor V. Skripachev (IQ UNESP) and Younes Messaddeq (IQ UNESP)

As-S glasses are perspective materials for making of the new generation of optical fibers – microstructural (MF) and photonic crystal fibers (PCF) fibers. We reported the first results on MF preforms and MF fiber preparation from As-S glass. MF preforms and fibers with one and double layers of microholes were obtained. Diameter of holes obtained correspond to that required for PBG-fibers, that is have micrometers size level. Fiber optical loss corresponded to that one of the initial glass and was at the level of 0,2 – 0,6 dB/m in the 2-6 mm wavelength region between impurity absorption bands. Fiber bending strength evaluated from the bending radius at the rupture is not less than 0.6 GPa for fiber without polymer cladding.

**D558 - SYNTHESIS OF HIGH HOMOGENEITY SILICA PHOTONIC GLASS: EFFECT OF SURFACE DEPOSITION TEMPERATURE**

Eduardo Ono (UNICAMP), Juliana Santiago Santos (UNICAMP) and

Carlos Kenichi Suzuki (UNICAMP)

The temperature distribution of VAD preform deposition surface is the most important parameter that influences on the silica nanostructure. In this work, it was studied the effect of H<sub>2</sub> and O<sub>2</sub> gas flux and the temperature distribution on silica homogeneity. The heterogeneities of sintered silica preforms samples were characterized by small-angle X-ray scattering. Homogeneous silica were obtained with H<sub>2</sub> = 6000 sccm e O<sub>2</sub> = 4000 sccm and temperature variation of 19°C along the deposition surface. The temperature distribution of the preform deposition surface controls the silica nanostructure.

**D559 - ER<sup>3+</sup>-ACTIVATED SiO<sub>2</sub>-ZrO<sub>2</sub> PLANAR WAVEGUIDES FOR PHOTONIC APPLICATIONS**

Maurizio Ferrari (IFN-CNR-Trento), Sidney José Lima Ribeiro (IQ-UNESP-Araraquara), João José Guimarães da Costa (Depto Química FFCLRP-USP) and Rogéria Rocha Gonçalves (Depto Química FFCLRP-USP)

In this work we describe the preparation of erbium-activated (100-x)SiO<sub>2</sub>-xZrO<sub>2</sub> planar waveguides, using the sol-gel methodology, with x ranging up to 30. The planar waveguides were optimized in order to confine one propagating mode at 1550 nm. Emission in the C-telecom band was observed exciting at 980 nm.

**D561 - LOW COST RCA CLEANING EFFECT INTO SILICON BULK LIFETIME**

Manuel Cid Sanchez (LME-EPUSP), Carlos Alberto Santos Ramos (LME-EPUSP) and Nair Stem (LME-EPUSP)

This work aims to evaluate the quality of silicon substrates by the minority carrier lifetime and the surface recombination velocity. In order to perform these measurements using the PCD technique, the thermal oxidation plus anneal was chosen. Thus, the samples were cleaned with the standard RCA process, only differing by the purity of the used chemical reagents. Good quality passivation and bulk lifetime were achieved, even if the “for analysis grade” chemical reagents ( bulk-min 0.498ms, S<sub>eff-max</sub> =27.0cm/s) are used, representing a significant reduction in the production cost and being of great interest for solar cell application.

**D564 - CHARACTERIZATION OF BIREFRINGENT TITANIA THIN FILMS DEPOSITED BY DC SPUTTERING**

Márcio de Almeida Valle (LME-PSI-EPUSP), Sebastião Gomes dos Santos Filho (LSI-PSI-EPUSP) and Hugo Puertas de Araujo (LSI-PSI-EPUSP)

This work presents a physical characterization of titania thin films. Birefringent materials have a wide range of applications in optics. Titania (TiO<sub>2</sub>) thin films were deposited by DC sputtering over tilted substrates and the birefringence was characterized as function of the deposition angle by the numerical difference between the refractive indices for s and p polarized-light beams. Titania two-cavity polarizing narrow-band Fabry-Perot filters presented transmitted light preferentially polarized (s or p), which corroborated the birefringent characteristics of the titania thin films.

**D565 - GROWTH IN DIFFERENT PH OF ZNO NANOPARTICLES IN POLYACRILAMIDE MATRIX**

João Marcos Madurro (Univ. Federal Uberlândia), Ana Graci Brito-

Madurro (Univ. Federal Uberlândia) and Érika Santos Reis (Univ. Federal Uberlândia)

ZnO nanoparticles incorporated in polyacrylamide were synthesized adding aqueous solution of zinc oxide in acrylamide:bisacrylamide copolymer. Optical properties of ZnO nanoparticles were studied by optical absorption and surface analysis. At room temperature, ZnO nanoparticles showed peaks mainly centered in 324 nm to pH 2, 4 and 11.

The quenching of the photoluminescence was detected in systems containing emitting polymer PPV and the azo dye, congo red (CR). The suspicion of that energy transference is occurring it was investigated increasing the space between the PPV and the azo dye CR. As a thickness of the spacer films are increased, fluorescence is gradually recovered. Using the photoisomerization property of the azo dye it is possible to induce orientation in these molecules and compare the energy transference when the orientation factor relating the geometry of donor-acceptor dipoles is improved.

**D566 - FIBER LASER: ERBIUM-DOPED SILICA GLASS**

Daniilo Leite Dalmon (UNICAMP), Eric Fujiwara (UNICAMP), Klaus Raizer (UNICAMP), Carlos Kenichi Suzuki (UNICAMP), Eduardo Ono (UNICAMP) and Edmilton Gusken (UNICAMP)

FIBER lasers are finding increasing use in various fields of industrial, medicine, military, and research activity applications, such as sensing, LIDAR (Light Detection and Ranging), test and measurements, spectroscopy, cutting, welding, bending, sintering, rapid prototyping [1], surgery and aesthetic [2]. The market for fiber laser expects to grow at an annual rate of 35%, in comparison of 9% grow of overall industrial laser sector, which actually reach US\$ 2 billion per year. Differently from conventional lasers, which depend on gas tubes or crystal bars, pumping systems, and precise alignment optics, a fiber laser is much simpler and cheaper.

**D578 - BLUE LUMINESCENCE EMISSION FROM STRUCTURALLY DISORDERED CaTiO3**

Elson Longo (UNESP), José A. Varela (UNESP), Antonio C. Hernandez (IFSC), Fábio S. DE Vicente (IFSC), Alberthmeire T. de Figueiredo (LIEC), Valéria M. Longo (LIEC) and Juliana Milanez (LIEC)

The CaTiO3 (CTO) powder was prepared by the polymeric precursor method (PPM) and characterized by means of X-ray diffraction (XRD), Raman spectroscopy (FTRaman), UV-Vis absorption, XANES and photoluminescence emission (PL) at room temperatures. The measured PL emission reveals that CTO emitted luminescence in the region of blue-green and red light. The PL is related to its structural order-disorder.

**D569 - STUDY OF THE LUMINESCENT PROPERTIES OF EU<sup>3+</sup> DOPED BARIUM MOLYBDATE**

Dulce Maria Melo (UFRN), Marcos T. Tanaka (UFSCar), Ana Paula Marques (UFRN), Ieda Lucia Rosa (UFSCar), Elson Longo (UNESP) and Edson Roberto Leite (UFSCar)

The study of the europium concentration in the properties of BaMoO4 was the objective in this work. This kind of compounds have attracted great attention due to their applications as scintillating materials in electro-optical like solid-state lasers and optical fibres. Ba<sub>1-x</sub>Eu<sub>x</sub>MoO<sub>4</sub> (x = 0.01; 0.05) were prepared by the Complex Polymerization Method. XRD show a crystalline BaMoO4 scheelite-type phase in both samples (JCPDS n° 29-0193). The red emission of the Eu<sup>3+</sup> was observed in the emission spectra at 523, 533 and 554 (5D1 7F0,1,2) and 578, 589, 614, 652 and 699 nm (5D0 7F0,1,2,3,4).

**D579 - SEMI-QUANTITATIVE ANALYSIS OF OXIDATION IN EuTe THIN FILMS GROWN BY MBE**

Paulo Henrique de Oliveira Rappi (INPE), Gustavo Barretto Vila (INPE) and Paulo Motisuke (INPE)

The unique magneto optical property of EuTe have attracted considerable attention due to their possibilities in spintronics. High quality EuTe are grown by MBE on BaF<sub>2</sub> substrate and capped with protective layer of BaF<sub>2</sub>. Samples with no protective layer oxidize when exposed to ambient atmosphere. The detailed knowledge of the aging and oxidation process of EuTe is very desirable, so EuTe films were exposed to ambient and O<sub>2</sub> atmospheres. The thicknesses of the oxide as well as the remaining EuTe layers were found combining high resolution X-ray diffraction measurements and optical measurements.

**D573 - MOLECULAR DYNAMICS SIMULATIONS OF THE INTERACTION BETWEEN THIOPHENE OLIGOMERS AND THE (101) TiO<sub>2</sub>-ANATASE SURFACE**

Helena Maria Petrilli (IFUSP), Marcelo Alves dos Santos (IFUSP) and Marília Junqueira Caldas (IFUSP)

A new parameterization is presented for the Universal Force Field in order to properly describe the structures of thiophene and para-phenylene based oligomers, TiO<sub>2</sub>-anatase bulk and the corresponding (101) TiO<sub>2</sub> surface. We also present the molecular dynamics results for the deposition of thiophene oligomers on the TiO<sub>2</sub> surface.

**D581 - INFRARED TO VISIBLE UP-CONVERSION IN Er<sup>3+</sup>/Yb<sup>3+</sup>-CODOPED SrTiO3 PEROVSKITE**

Carlos E J Carneiro (UFRN), Pollyana S de Lima (UFRN), Dulce M A Melo (UFRN), José E C da Silva (UFT) and Francisco C D Lemos (UFRN)

Efficient infrared to visible conversion by Er<sup>3+</sup>/Yb<sup>3+</sup>-codoped SrTiO<sub>3</sub> perovskite will be reported. The process is observed under 980 nm laser excitation resulting the generation of green (~ 550 nm) and red (~ 663 nm) emission. The mechanism is attributed the energy transfer among Yb and Er ions in excited states

**D585 - PHOTOLUMINESCENT PROPERTIES OF LA1-XEUX[O2(PH)2]3**

Elizabeth Berwerth Stucchi (UNESP), Edson Martins de Abreu (UNESP) and Cristina Santana Francisco (UNESP)

The present work reports the characterization, quantum efficiency and luminescence spectroscopy of europium activated diphenylphosphinate of lanthanum. The objective is develop spectroscopic investigations of these

**D576 - CONTROL OVER RESONANT ENERGY TRANSFER IN PPV/AZODYE LBL FILMS**

Oswaldo Novais Oliveira Jr (IFSC), Valtencir Zucolotto (IFSC) and Bruna Bueno Postacchini (IFSC)

series in order to enhance the application to Light Molecular Conversion Device with visible light emitting. Triclinic crystalline system with formation of chain due to interplanar distance of 12 Å in low angle (7°). The complexes are thermostable up to about 445 °C. The optimum value of the efficiency yield is 62.8% to 20% of europium. The spectra show different characteristics as a function of either the europium molar concentration or excitation wavelength.

**D587 - TiO<sub>2</sub> NANORODS BY DECOMPOSITION OF TI-PEROXY COMPOUNDS**

Edson Roberto Leite (UFSCar), Cristiane Vila (UFSCar), Daniel Grando Stroppa (UFSCar) and Elson Longo (Unesp)

This work reports a simple, low-cost and environmental clean method to obtain crystalline TiO<sub>2</sub> nanorods. The particles characteristics were studied by varying the synthesis route parameters. The particles obtained were characterized by XRD and SEM.

**D588 - ELECTRICAL CHARACTERISTICS OF HYBRID TRANSISTORS WITH SILANATED SILICON**

Ivo Alexandre Hümmelgen (UFPR), Michelle Sostag Meruvia (UFPR) and Lucieli Rossi (UFPR)

The electric characterization of hybrid transistors produced with organic emitter and base is presented. Because the organic base layer is difficult to produce, a silane monolayer was introduced between the base and collector in order to improve base deposition and base film uniformity. A detailed comparison of the performances of transistors produced with and without the silane layer is presented.

**D589 - STUDY OF PHOTOINDUCED EFFECTS IN GeS<sub>2</sub> + Ga<sub>2</sub>O<sub>3</sub>**

Sandra Helena Messaddeq (IQ-UNESP), Máximo Siu Li (IFSC-USP), Daniel Baladelli Mazulquim (IFSC-USP), Alessandra Carla Mendes (IFSC-USP) and Younés Messaddeq (IQ-UNESP)

The present work reports the production of photosensitive glasses and shows the observation and characterization of photoinduced phenomena, mainly photochromic and photostructural effects in GeS<sub>2</sub> + Ga<sub>2</sub>O<sub>3</sub> samples, either in bulk or in film shapes. The main observed results are an optical absorption shift and a volumetric expansion when exposed to light with a determined energy and exposure time. A study of the exposure time dependence and the power density of the 350nm Kr laser line are given. Such materials have potential use for optical devices like surface Bragg gratings and microlens array.

**D590 - PERMEABLE-BASE TRANSISTOR UTILIZING AN ORGANIC SEMICONDUCTOR AS EMITTER**

José Serbena (UFPR) and Ivo Hümmelgen (UFPR)

In this work we present the results of Semiconductor-Metal-Semiconductor transistors utilizing an organic semiconductor, an indenofluorene derivative, as emitter. The base and collector are respectively tin and p-doped silicon. The devices were electrically characterized at two and three-terminal measurements and were operated in common-base and common-emitter modes.

**D591 - EFFECTS OF NON-UNIFORM SIZE DISTRIBUTION ON THE SPECTRAL OPTICAL GAIN PROPERTIES OF INGAAS/INGAASP QUANTUM DOTS**

Newton Cesário Frateschi (UNICAMP) and José Roberto Mialichi (UNICAMP)

We present the theoretical study of optical gain in quantum dots based on the InGaAs/InGaAsP system. With typical non-uniform distribution, we show a reduction in gain by a factor of 3. We predict the onset of new transition peaks and a red shift in the most probable operating lasing wavelength.

**D592 - CARBON NANOTUBE-POLYTHIOPHENES PHOTOVOLTAIC DEVICES WITH QUITE HIGH OPEN-CIRCUIT VOLTAGE**

Adelina Pinheiro Santos (CDTN/CNEN), Clascidia Aparecida Furtado (CDTN/CNEN), Bruno Lomba (Unicamp), Ana Flávia Nogueira (Unicamp), Ivo Alexandre Hümmelgen (UFPR), Rodolfo Luiz Patyk (UFPR), Regina Maria Queiroz de Mello (UFPR) and Liliana Micaroni (UFPR)

We report the development of bilayer organic photovoltaic devices using polybithiophenes and modified single walled carbon nanotubes as active layers deposited onto fluorine-doped tin oxide having top metallic contact. The devices show open-circuit voltage around larger than 1 V.

**D594 - SYNTHESIS AND CHARACTERIZATION OF LiF: Mg,Ti THERMOLUMINESCENT MATERIAL**

Carlos Alberto Pelá (CIDRA/DFM/FFCL-RP/USP), José Luiz Bruçó (CIDRA/DFM/FFCL-RP/USP), Aline Bertolini Guarnieri (CIDRA/DFM/FFCL-RP/USP), Fábio Luiz Godoy (DQ/FFCL-RP/USP) and Herenilton Paulino Oliveira (DQ/FFCL-RP/USP)

Among potential thermoluminescence dosimeters (TLD), LiF-based materials have received extensive studies because of its good tissue equivalence. In this context, this work describes the preparation procedure of LiF:Mg,Ti dosimeter and the studies of its thermoluminescent response to high-energy radiation. The presented results show that the sensitivity of the dosimeters is highly dependent on the thermal treatment as well as the synthetic conditions such as reactional temperature, starting reactants and concentration of the dopants.

**D595 - PHOTOLUMINESCENCE OF EU<sup>3+</sup> ION IN SnO<sub>2</sub> OBTAINED VIA SOL-GEL**

Americo Sheitiro Tabata (DF-FC-UNESP), Luis Vicente de A. Scalvi (DF-FC-UNESP), Evandro Augusto de Moraes (DF-FC-UNESP), José Bras B. Oliveira (DF-FC-UNESP) and Sidney José L. Ribeiro (IQ-UNESP)

Luminescent properties of Eu<sup>3+</sup> ions in SnO<sub>2</sub> matrix, obtained by sol-gel process, allows observation of substitutional Eu<sup>3+</sup> in Sn<sup>4+</sup> sites, besides Eu<sup>3+</sup> segregated at grain boundary, which is analyzed through the emission rate 5D<sub>0</sub>-7F<sub>2</sub>/5D<sub>0</sub>-7F<sub>1</sub>, at 266 and 488nm excitation. It has been detected an intensity increase in 5D<sub>0</sub>-7F<sub>1</sub> emission between 10-260K, followed by a decrease for higher temperatures, which is associated with low phonon emission. Eu-doped SnO<sub>2</sub> presents significant luminescence at room temperature, which makes this material very attractive for technological applications.



**D596 - ELECTRON PARAMAGNETIC RESONANCE, PHOTOACOUSTIC AND UV-VISIBLE INVESTIGATION OF COLOR CENTERS IN SOME BRAZILIAN PRECIOUS STONES SPECIES. PART I: TOURMALINES**

Reinhard Richard Wegner (UFCG/UAMG), Jaldair Araújo Nobrega (UFCG/UAF), Rodrigo Jose da Silva Lima (UFPB/DF) and José Suassuna Filho (UFCG/UAF)

Electron Paramagnetic Resonance (EPR) and Photoacoustic Spectroscopy (PAS) experiments in the visible and ultraviolet regions of the electromagnetic spectrum were carried out on a variety of tourmaline species. The results of our investigation show that EPR and PAS can be seen as a powerful alternative spectroscopic tool in the identification and characterization of color centers in mineral specimens.

**D597 - ELECTRON PARAMAGNETIC RESONANCE, PHOTOACOUSTIC AND UV-VISIBLE INVESTIGATION OF COLOR CENTERS IN SOME BRAZILIAN PRECIOUS STONES SPECIES. PART II: BERYLS**

Reinhard Richard Wegner (UFCG/UAMG), Jaldair Araújo Nobrega (UFCG/UAF), Rodrigo José da Silva Lima (UFPB/DF) and José Suassuna Filho (UFCG/UAF)

Electron Paramagnetic Resonance (EPR) and Photoacoustic Spectroscopy (PAS) experiments in the visible and ultraviolet regions of the electromagnetic spectrum were carried out on a variety of beryl species. The results of our investigation show that EPR and PAS can be seen as a powerful alternative spectroscopic tool in the identification and characterization of color centers in mineral specimens.

**D598 - CORRELATION BETWEEN THERMAL DIFFUSIVITY AND PERCENT CRYSTALLINITY IN SINGLE POLYMERS INVESTIGATED BY PHOTOACOUSTIC SPECTROSCOPY AND DSC**

Rodrigo José da Silva Lima (UFPB/DF), Laerson Duarte Silva (UFCG/UAF), Jaldair Araujo Nobrega (UFCG/UAF), Renilton Correia Costa (UFPB/DF) and José Suassuna Filho (UFCG/UAF)

In his work PAS and DSC techniques have been used to measure the thermal diffusibility and percent crystallinity of the polymers listed above and of PET samples that were previously submitted to several annealing conditions from one day until twenty days. The level of crystallinity was found to increase significantly with the increase of the annealing time interval, reaching the higher value of ~ 30% for a period of six days.

**D599 - OLEDs BASED ON LAQ3 AND YQ3 MOLECULAR COMPLEXES MARCO CREMONA (PUC-RIO), CRISTIANO LEGNANI (INMETRO), WELBER G. QUIRINO (INMETRO), MARCO AURÉLIO GUEDES (USP) AND HERMI F. BRITO (USP)**

In this work, the fabrication and the electroluminescence properties of double-layer devices using a new kind of tris(8-hydroxyquinoline)M - (Mq3), where M is Al (aluminium), La (lanthanum) or Y (yttrium), as transporting and emitting layer are compared and discussed. The OLED devices based on these complexes present the following configurations: device 1: ITO/TPD(40 nm)/Alq3(40 nm)/Al(150 nm); device 2: ITO/TPD(40 nm)/Yq3(25 nm)/Al(150 nm); device 3: ITO/TPD(40 nm)/Laq3(25 nm)/Al(150 nm). A

comparison between their electroluminescence spectra presents a red shift from device 1 to 3.

**D600 - COOPERATIVE LUMINESCENCE IN TELLURITE GLASSES DOPED WITH YB<sup>3+</sup>**

Márcio Alencar (UFAL), Niklaus Ursus Wetter (IPEN), Jonas Jakutis (IPEN), Luciana Reyes Pires Kassab (FATEC - SP) and Renata Andrade Kobayashi (EPUSP)

This work presents the results of cooperative luminescence in different compositions of tellurite glasses. The emission measured in the visible region, centered at 500 nm, is a strong indication of the presence of the cooperative luminescence; it corresponds to half of the wavelength value of the near infrared luminescence. The samples were prepared at the Laboratory of Glasses and Datation at FATEC-SP. The blue luminescence can be seen by naked eyes and the authors do not know of any study related to the cooperative luminescence of Yb<sup>3+</sup> in the compositions studied.

**D601 - ELECTRODEPOSITION AND CHARACTERIZATION OF CADMIUM TELLURIDE ON SILICON SUBSTRATE**

Marco Polo Oliveira da Silva (UFV), Alexandre Tadeu Gomes de Carvalho (UFV), Luciano Moura Guimarães (UFV) and Regina Simplicio Carvalho (UFV)

Thin films of CdTe have been electrodeposited from an acid solution. The structural, morphological and optical properties of these films have been studied. An X-ray diffraction study revealed that CdTe deposited at 85 °C are polycrystalline with a cubic phase. The optical absorption studies showed that bandgap of CdTe is 1.54 eV.

**D603 - ELECTROSYNTHESIS OF A DIALKOXY-PPV AND ITS CHARACTERIZATION**

Rosamaria Li (USP), Elaine Yamauchi (USP), Ivo Hümmelgen (UFPR), José Serbena (UFPR) and Jonas Gruber (USP)

PPV derivatives are much studied in organic optoelectronic devices, especially in light emitting diodes, due to their good electro-optical properties. In this work we present an alternative cheaper synthesis of poly(2,5-dioctyloxy-p-phenylenevinylene), its optical and physical characterization, and its application to a light emitting device.

**D604 - OPTICAL PROPERTIES CALCULATIONS IN NITRIDES HETEROSTRUCTURES**

Eronides Felisberto da Silva Jr (UFPE), Sara Cristina Pinto Rodrigues (UFPE), Marcel Nogueira d' Eurydice (IFSC) and Guilherme Matos Sipahi (IFSC)

In this work we studied optical properties of nitride-based semiconductors heterostructures. The numerical calculations are based on the k.p effective mass model for valence and conduction bands, subsequently used for theoretical luminescence and absorption calculations.

### D606 - HOLOGRAPHIC CHARACTERIZATION OF SB-BASED FILMS

Marcelo Nalin (Unicamp), Luis Fernando de Avila (Unicamp) and Lucila Cescato (Unicamp)

Antimony based materials are interesting for data storage because their optical constants may be changed under laser irradiation. The use of films, instead of bulk materials, is more interesting for fabrication of devices. In this work we have obtained good optical quality of calcogenide amorphous films containing antimony and we have measured their real time optical changes using a holographic setup and a phase sensitive technique. The initial results shown that the films present both absorption coefficient and in the refractive index modulations.

### D610 - STUDY OF INFRARED AND UV STIMULATED SPECTRA OF ALKALI FELDSPARS

Sonia Hatsue Tatumi (FATEC-SP), Davinson Mariano da Silva (EPUSP), Jorge dos Santos Lyra (FATEC-SP) and José Francisco Sousa Bitencourt (EPUSP)

Emission bands of feldspars were observed in order to determine a new emission band which can be used for radiation dosimetry and optical dating purposes. The bands related to  $Ti^{3+}$ ,  $Fe^{3+}$  and Al<sup>3+</sup>-O<sup>2-</sup> centers were observed in samples irradiated with gamma-radiation from a Co source. The intensities of the samples increased with crescent doses.

### D611 - GAS PRESSURE EFFECT ON THE FORMATION OF SN AND PBSE NANOCRYSTALS INSIDE NE BUBBLES IN SI(001)

Marie France Beaufort (Univ. Poitiers), Paulo F. P. Fichtner (DEMET-UFRGS), Erwan Oliviero (Univ. Poitiers), Ricardo M. Papaleo (PUC-RS), Shay Reboh (PGCIMAT-UFRGS), Francis Rossato (IC-UFRGS), Marcio J. Mörschbacher (IF-UFRGS), Tatiana L. Marcondes (PPGMICRO-UFRGS) and Augusto A. D. de Mattos (PPGMICRO-UFRGS)

We study the formation of Sn and PbSe nanocrystals inside Ne bubbles in Si(001) samples in order to develop more efficient thin film Si based photovoltaic devices. The results obtained demonstrate that the gas pressure inside the cavities strongly affects the formation of the desired nanocrystals.

### D613 - MN-IMPLANTED INGAASP QUANTUM WELLS FOR SPINTRONICS APPLICATIONS

Evaldo Ribeiro (DFis - UFPR), Edilson Silveira (DFis - UFPR), Tárík Kaiel Machado Cardoso (DFis - UFPR), Rogério Luiz Maltez (IF - UFRGS) and Wilson Carvalho Jr. (LNLS)

We investigate the effects of Manganese implantation on the optical properties of semiconductor quaternary quantum wells in order to assess its potential as an alternative approach to spintronic materials, in particular for spin-polarized optoelectronics. Raman scattering measurements show that the In-related modes are strongly reduced, indicating that Mn atoms might preferentially replace In atoms in the quantum well alloy. We acknowledge financial support from PIBIC/CNPq and PQ/CNPq. Raman measurements were performed at the DQui-UFPR Raman spectroscopy lab.

### D614 - SEMICONDUCTING PPVS WITH DIFFERENT CONJUGATION LENGTHS

Roberto Koji Onmori (Universidade de São Paulo), Wang Shu Hui (Universidade de São Paulo) and Tunisia Eufrausino Schuler (Universidade de São Paulo)

We have synthesized phenylene-vinylene polymers (PPV) with two controlled conjugated segment lengths, intercalated with aliphatic chain, in different proportions. The prepared copolymers' structures were characterized by infrared, ultraviolet-visible spectroscopies and hydrogen nuclear magnetic resonance spectrometry. Polymers molecular weights were determined by gel permeation chromatography. The effect of polymer structure and composition on emission properties was studied by fluorescence spectroscopy under different irradiation wavelength.

### D615 - INVESTIGATION ON ELECTROPLEX EMISSION IN DIPIRYDAMOLE MOLECULE BASED OLED

Marco Cremona (PUC-Rio), Marcel Tabak (USP), Sonia Renaux Louro (PUC-Rio), Welber Gianini Quirino (Inmetro) and Cristiano Legnani (Inmetro)

In this work, we demonstrate the presence of electroplex emission in electroluminescence spectra of organic light emitting diodes based on dipirydamole.

### D616 - CERIUM BASED PHOPHORS: BLUE LUMINESCENT PROPERTIES FOR DISPLAY APPLICATIONS

Osvaldo Antonio Serra (FFCLRP-USP) and Janaina Gomes (FFCLRP-USP)

Phosphors materials essentially convert certain types of energy into electromagnetic radiation, usually in visible range, and should not absorb that radiation. Phosphors activated by rare earth (RE) ions exhibit some peculiarities. In this work we describe the preparation of luminescent blue emitting Ce<sup>3+</sup> activated gadolinium vanadate phosphor obtained through a novel combustion synthetic method using glycine as fuel. The blue photoluminescence (PL) observed in the multi-component oxide phosphor GdVO<sub>4</sub>:Ce<sup>3+</sup> is described.

### D617 - CHARACTERIZATION OF TRANSPARENT CONDUCTING ITO THIN FILM DEPOSITED BY PECHINI METHOD

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Indium tin oxide (ITO) is a very attractive material for optoelectronic applications due to its useful properties such as high transmittance in the visible region of the spectrum and high conductivity. Dependence of the electro-optical properties on substrate temperature and annealing temperature has also been reported. This is true because the properties of ITO depend deeply on its oxidation state and also on the impurity content. In this work we demonstrate the relationships between structural and electro-optical properties of ITO thin film, deposited by Pechini method.

**D618 - EVALUATION OF THE REMOVAL OF IMPURITIES IN POLYCRYSTALLINE SILICON SAMPLES PURIFIED UNDER ELECTRON BEAM MELTING**

Adriana Bueno Braga (UNICAMP/FACAMP), Simone Moreira (UNICAMP), Donga R Souza (UNICAMP) and Paulo Roberto Mei (UNICAMP)

The objective of this work was to study the influence of electron beam melting process on the removal impurities in metallurgical grade silicon by segregation. Preliminary results suggest Boron removal, however the concentration decreased from 11 to 8,2 ppm wt. Titanium decreased from 42 to below than 0,01ppm wt.

**D619 - ELECTRICAL AND STRUCTURAL PROPERTIES OF TRANSPARENT CONDUCTING ZNO:GA THIN FILM DEPOSITED BY SOL - GEL METHOD**

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Endowed with interesting properties ZnO has deserved great attention in many applications. The combination of its electrical and optical properties enables it to be used as transparent conductive oxide (TCO) in several optoelectronic devices. However, since its intrinsic electrical resistivity is relatively high, ZnO is commonly doped with Al<sup>3+</sup> or Ga<sup>3+</sup>, improving its electrical and optical properties. In this work, the relation between optical, electrical and structural properties of ZnO:Ga thin films deposited by sol-gel method were investigated and discussed.

**D620 - CDS/CDTE SOLAR CELLS WITH DIFFERENT ANNEALING TEMPERATURES**

Carlos Luiz Ferreira (Inst. Militar Engenharia), Rosangela Pinto Alves (Inst. Militar Engenharia), Wagner Anacleto Pinheiro (Inst. Militar Engenharia), José Sousa Fernandes (Inst. Militar Engenharia) and Leila Rosa Cruz (Inst. Militar Engenharia)

CdS/CdTe cells were submitted to the well known cadmium chloride heat treatment at 420 °C and 450 °C. The influence of the annealing temperature on the photovoltaic parameters was investigated. The results showed that the temperature of 450 °C is more effective for annealing CdTe cells, since short curt current density, open circuit voltage and efficiency increased.

**D621 - POTENTIAL USE OF THE SERPENTINE GROUP MINERAL FOR RADIATION DOSIMETRY**

Sonia Hatsue Tatumi (FATEC-SP) and René Rojas Rocca (IF-USP)

Emission spectra both lizardite and antigorite gamma-rays irradiated crystals have been investigated in order to verify their luminescence response. When the samples were stimulated with UV radiation we found several emission bands, the prominent were 422 and 461 nm. By using IR stimulation, emission bands at 362, 392, 485 and 590 nm were found and the possibility of the use of these bands in radiation dosimetry have been analyzed.

**D622 - INK JET DEPOSITION OF POLYFLUORENE TO**

**PLEDS DISPLAYS**

Adnei Melges de Andrade (USP - POLI), Rodrigo Fernando Bianchi (UFOP) and Alex Frazatti Silva (USP - POLI)

We present a study of polyfluorene ink jet deposition to be applied on the fabrication of Polymeric Light Emitting Diodes – PLEDs used in Displays. Through different treatments on the surface of ITO, we identified a treatment which can be satisfactory applied. The electrical characteristics of surface, the morphology of deposition and solutions characteristics were studied.

**D623 - MAGNETIC FIELD DEPENDENT CHARGE TRANSPORT CHARACTERISTICS IN A HYBRID TRANSISTOR**

Rosamaria Wu Chia Li (USP), Jonas Gruber (USP), Ivo Alexandre Hümmelgen (UFPR) and Michelle Sostag Meruvia (UFPR)

The observation of magnetic field dependent charge transport in hybrid transistors using polyfluorophenylenevinylenes as emitter is presented. We also try to address the phenomena behind the effect. For this we realize optical and electrical measurements in the polymers, which demonstrate that changes in energetic disorder contribute to the observed magnetoresistance.

**D625 - SYNTHESIS OF SILICA-TITANIA GLASS BY FLAME AEROSOL TECHNOLOGY**

Juliana Santiago dos Santos (UNICAMP), Rita Helena Buso Jacon (UNICAMP), Claudia Carvalho Nunes (UNICAMP), Eduardo Ono (UNICAMP) and Carlos Kenichi Suzuki (UNICAMP)

High purity SiO<sub>2</sub>-TiO<sub>2</sub> glasses with TiO<sub>2</sub> concentration varying from 1 wt % to 10 wt % were produced by the flame aerosol technology known as VAD (Vapor-phase Axial Deposition). SiCl<sub>4</sub> and TiCl<sub>4</sub> were used as precursors and TiCl<sub>4</sub> carrier gas was used to control the TiO<sub>2</sub> concentration. X-ray fluorescence and X-ray diffraction techniques were employed to determine TiO<sub>2</sub> concentration and crystalline phase. TiO<sub>2</sub> concentration profile and crystallization level were correlated to process parameters in order to obtain a highly transparent material.

**D626 - THEORETICAL INVESTIGATION OF POLY(TRANS-1, 2-DI(2-THIENYL) ETHYLENE): INSULATOR-TO-METAL TRANSITION AND EFFECTS ON THE OPTICAL PROPERTIES**

Bernardo Laks (UNICAMP) and Nei Marcal (UNICAMP-UERGS)

In this work we calculate the density of states for long finite one-dimension Poly(trans-1,2-di(2-thienyl)ethylene) (PTE) chains with a disordered distribution of bipolaron defects. The electronic structures of PTE oligomers were theoretically analyzed following models based on neutral and charged oligomers for 1 < 7.

**D627 - STUDY OF RADIATION ENERGY EFFECT ON A VARIETY OF MATERIALS USED FOR EPR DOSIMETRY**

Angela Kinoshita (Univ. Sagrado Coracao), Arhthur Felipe Nisti Grigoletto Borgonove (USP), Feliipe Chen (USP), Patricia Nicolucci (USP) and Oswaldo Baffa (USP)

Energy dependence and sensitivity are important characteristics of a dosimeter. In this work these qualities were studied for some EPR dosimeters in the clinical x-ray energy range. Sucrose was the most sensitive material, and hydroxyapatite and calcite showed higher energy dependence.

**D628 - OPTICAL OSCILLATOR STRENGTHS AND ULTRA-VIOLET EDGE ABSORPTION BY TELLURITE GLASSES**

Hermes Adolfo Aquino (Unesp), Eudes Borges Araújo (Unesp), Salmo Moreira Sidel (Unesp), Wilson Alves Capanema (Unesp) and Keizo Yukimitu (Unesp)

The optical absorption in the uv-vis and infrared spectral region were done on the glass system:  $(20-x)\text{Li}_2\text{O}-80\text{TeO}_2-x\text{TiO}_2$ . The Drude-Lorentz model is applied to determine the effective resonance frequency and the difference in the cut-off frequency observed between samples with  $x = 5\%$  and  $10\%$  was used to determine the natural resonance frequency and thus determine  $N$ , the oscillators density. Spectra of the region between  $500\text{ cm}^{-1}$  and  $800\text{ cm}^{-1}$  will be discussed in function of the presence of Te-O-Te and Te-O-Ti radicals, correlating with the expression for the refraction index due to Wemple.

**D629 - PREPARATION AND CHARACTERIZATION OF TELLURITE BASED GLASSES CONTAINING  $\text{SnO}_2$  AND  $\text{GeO}_2$**

Sidney José Lima Ribeiro (UNESP), Younes Messaddeq (UNESP) and Fabia Castro Cassanjes (UNESP)

Tellurite glasses have scientific and technological interest due to their refractive indices, dielectric constants and phonon energies compared for instance with the well known silicate or phosphate glasses. Vitreous samples have been prepared and characterized in the system  $(70-x)\text{TeO}_2-(x)\text{YO}_2-10\text{Nb}_2\text{O}_5-10\text{K}_2\text{O}-10\text{Li}_2\text{O}$  ( $Y = \text{Ge}$  or  $\text{Sn}$ ). The study was focused on the variation of properties in function of the  $\text{SnO}_2$  and  $\text{GeO}_2$  addition. Some these vitreous compositions presented a high thermal stability against crystallization and good optical properties.

**D630 - SILVER-MODIFIED TITANIA THIN FILMS APPLIED TO PHOTOCATALYTIC DECOMPOSITION OF MEDICINE WASTES ON RESIDUARY WATER**

Margarida Juri Saeki (IBB-UNESP), Ariovaldo Oliveira Florentino (IBB-UNESP), Juliana Catarina Bruno (IBB-UNESP) and Alberto Adriano Cavalheiro (IBB-UNESP)

The effect of silver on  $\text{TiO}_2$  thin film prepared by the sol-gel technique was investigated by XRD, SEM and UV-Vis spectroscopy. The changes in the characteristics of the material were correlated to the efficiency of degradation process for substances related to medicines wastes, which are commonly present in residuary water deriving from pharmaceutical industry.

**D631 - EFFECT OF SCANDIUM ON STRUCTURAL AND PHOTOCATALYTIC PROPERTIES OF TITANIUM DIOXIDE THIN FILMS**

Margarida Juri Saeki (IBB-UNESP), Ariovaldo Oliveira Florentino (IBB-UNESP), Alberto Adriano Cavalheiro (IBB-UNESP) and Juliana Catarina Bruno (IBB-UNESP)

The effect of scandium concentration on titania thin film prepared by sol-gel method was investigated by XRD, UV-Vis spectroscopy and SEM, and its influence on the photocatalytic activity was also studied. The experimental conditions as number of dip-coating and withdrawal speed were optimized in order to prepare the  $\text{Sc-TiO}_2$  thin films.

**D632 - CONTROLLED DEPOSITION OF ULTRATHIN  $\text{SnO}_2$ :F FILMS BY SPIN-COATING**

José Arana Varela (UNESP), Caue Ribeiro (UFSCar), Tania Regina Giraldo (UFSCar), Tiago de Góes Conti (UFSCar), Elson Longo (UNESP) and Edson Roberto Leite (UFSCar)

This work reports a new method to obtain ultrathin  $\text{SnO}_2$ :F films by spin-coating deposition of nanocrystal water-based colloidal suspensions. The particles and films characteristics were studied by varying the Sn:F molar ratio. The characterization methods applied were photoluminescence, TEM, XRD, UV-Vis-NIR and ellipsometry.