

NEW MATERIALS AND COMPOUNDS

Inorganic and Organometallic Chemistry

Publications in Journals

1. MARÇALO, J., PIRES DE MATOS, A., EVANS, W.J., "Gas Phase Chemistry of Bis(pentamethylcyclopentadienyl)Samarium", *Organometallics* **15** (1996) 345.
2. PAULO, A., DOMINGOS, A., SANTOS, I., "Co-ordination of Tetrakis(pyrazolyl)borate in Rhenium (V) Complexes Containing the Unity $[\text{Re}^{\text{V}}=\text{O}]^{3+}$ ", *Inorg. Chem.* **35** (1996) 1798.
3. CORNEHL, H., HEINEMANN, C., MARÇALO, J., PIRES DE MATOS, A., SCHWARZ, H., "The "Bare" Uranyl (2+) Ion, UO_2^{2+} ", *Angew. Chem. Int. Ed. Engl.* **35** (1996) 891.
4. COQUEL, J.M., GASCHÉ, T.A, WILKES, J., FRIEDRICH, C.M., LAMONT, C.L.A., MACDONALD, M. A., PALMER, R.E., MOUTINHO, A.M.C., "Photon Stimulated Ion Desorption from Polyatomic Molecules in the VUV: $\text{C}_2\text{H}_4/\text{Graphite}$ ", *J. Phys.: Condens. Matter* **8** (10) (1996) L153-158.
5. CAMPELLO, M. P. C., CALHORDA, M. J., DOMINGOS, A., GALVÃO, A., LEAL, J., PIRES DE MATOS, A., SANTOS, I., "Hydrocarbyl Derivatives of $[\text{UCl}_2\{\text{HB}(\text{pz})_3\}_2]$: Synthesis, Characterization and Reactivity Studies Towards Protic Substrates and Ketones", *J. Organomet. Chem.*, in press
6. TRIFONOV, A. A., VAN DE WEGHE, P., COLLIN, J., DOMINGOS, A., SANTOS, I., "Synthesis of Lanthanide Complexes Cordinated by an Asymmetric Cyclopentadienyl Ligand", *J. Organomet. Chem.*, in press.
7. MARÇALO, J., LEAL, J.P., PIRES DE MATOS, A., "Gas Phase Actinide Ion Chemistry: Activation of Alkanes and Alkenes by Thorium Cations", *Int J. Mass Spectrom. Ion Processes* **157/158** (1996) 265.

Special Publications, Book Chapters, Others

1. LEAL, J.P., "Handling of Air Sensitive Compounds", *Química* **59** (1996) 56.

Internal Reports

1. PIRES DE MATOS, A., "Chemical Behaviour of Actinide, Lanthanide, Scandium and Yttrium Compounds in Heterogeneous Phase", R&D Programme/Inv. Coord., 1996.

Communications to Conferences

1. DOMINGOS, A., MARQUES, N., SILVA, M., TROFIMENKO, S. "Rearrangement of Hydrotris(3-Mesityl-1-yl)Borate into Hydrobis(3-Mesityl-1-yl)(5-Mesityl-1-yl)borato]trichlorouranium(IV), $U[HB(3-Mspz)_2(5-Mspz)]Cl_3$ ", *31st International Conference on Coordination Chemistry*, Vancouver, August 1996.
2. LEAL, J.P., MARÇALO J., PIRES DE MATOS, A., MARSHALL, A.G., "Periodicity in the Reactivity of Lanthanide Ions with Naphthalene and Mesitylene - Thermodynamic and Kinetic Trends", *8th Sanibel Conference on Mass Spectrometry*, Sanibel, Florida, USA, January 1996.
3. PISSAVINI, M., GÉRIBALDI, S., MARÇALO, J., DECOUZON, M., AZZARO, M., "Activation of Phenol by Lanthanide Monocations in the Gas Phase" *9^{ème} Journée de la Chimie, Provence-Alpes-Côte d'Azur*, Nice, France, March 1996.
4. LEAL, J.P., NUNES, P., MINAS DA PIEDADE, M.E., "Alkaline Metal Alkoxides", *Network Meeting Selective Processes and Catalysis Involving Small Molecules*, ITBQ, Oeiras, Portugal, April 1996.
5. PIRES DE MATOS, A., MARÇALO, J., "Studies on Gas-phase Chemistry of Actinides - The Role of *f* Electrons in Their Chemistry", Extended Abstracts, CO1, Vol. I., Eds. F. David and J.C.Krupa, I.P.N., Orsay. *4th International Conference on Nuclear and Radiochemistry*, St. Malo, France, 8-13 September 1996.
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8. COQUEL, J. M., ALMEIDA GASCHE, T., WILKES, J., FRIEDRICH, C. M., A. LAMONT, C. L., MACDONALD, M. A., PALMER, R. E., MOUTINHO, A. M. C., "Photon Stimulated Ion Desorption of C_2H_4 Adsorbed on Graphite", *ECOSS 16 (16th European Conference on Surface Science)*, Genova, Italy, September 1996.
9. COQUEL, J. M., SILLER, L., PALMER, R. E., CARRAPA, R., MOUTINHO, A. M. C., WILKES, J., LAMONT, C. L., ALMEIDA GASCHE, T., "Carbon-Dioxide Adsorbed on Graphite: a Photon Stimulated Desorption Study", *FÍSICA-96 – 10th National Conference of Physics*, Faro, Portugal, 13-17 September 1996.
10. LEITÃO, C. M. M., ALMEIDA GASCHE, T., BENNET, R., TEODORO, O. M. N., BONFAIT, G., MOUTINHO, A. M. C., "Sample Holder for Using in Surface Studies (77-1300 K)", *FÍSICA-96 – 10th National Conference of Physics*, Faro, Portugal, 13-17 September 1996.

Nuclear Solid State Physics Using Ion Beams

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1. SOCHINSKII, N.V., DIÉGUEZ, E., ALVES, E., SILVA, M.F., SOARES, J.C., BERNARDI, S., GARRIDO, J., AGULLÓ-RUEDA, F., "Laser-assisted Recrystallization to Improve the Surface Morphology of CdTe Epitaxial Layers", *Semicond. Sci. Technol.* **11** (1996) 248-251.
2. SOCHINSKII, N.V., SOARES, J.C., ALVES, E., SILVA, M.F., FRANZOSI, P., BERNARDI, S., DIÉGUEZ, E., "Structural Properties of CdTe and Hg_{1-x}Cd_xTe Epitaxial Layers Grown on Sapphire Substrates", *Journal Cryst. Growth* **161** (1996) 195-200.
3. SOCHINSKII, N.V., SOARES, J.C., ALVES, E., SILVA, M.F., FRANZOSI, P., DIÉGUEZ, E., "Structural Properties of Hg_{1-x}Mn_xTe Layers Grown on CdTe Substrates by Liquid Phase Epitaxy", *Semicond. Sci. Tech.* **11** (1996) 542-547.
4. AGER, F.J., RESPALDIZA, M.A., BOTELLA, J., SOARES, J.C., SILVA, M.F., BENÍTEZ, J.J., ODRIOZOLA, J.A., "Rutherford Backscattering Spectrometry (RBS) Characterization of Oxide Scale Formed on (AISI-304) Steel After Surface Deposition of Lanthanum", *Acta Mater.* **44** (1996) 675-681.
5. FERRERO CALABUIG, J.L., MARTIN SÁNCHEZ, A., ROLDÁN GARCIA, C., ROSELLÓ FERRANDO, J., SILVA, M.F., SOARES, J.C., VERA TOMÉ, F., "Characterization of Alpha Sources by Rutherford Backscattering Spectrometry", *Nucl. Instr. and Meth.* **A369** (1996) 603-607.
6. KRAUSE, H., FLAGMEYER, R.-H., VOGT, J., KLING, A., BUTZ, T., "Defect Development and Dopant Location Due to Elevated Temperature Implantation of InP with MeV Zinc Ions", *Nucl. Instr. and Meth.* **B113** (1996) 209.
7. KLING, A., MARQUES, J.G., CORREIA, J.G., SILVA, M.F., DIÉGUEZ, E., AGULLÓ-LÓPEZ, F., SOARES, J.C., "Study of Structural Differences Between Stoichiometric and Congruent Lithium Niobate", *Nucl. Instr. and Meth.* **B113** (1996) 293-295.
8. RODRÍGUEZ, T., ALMENDRA, A., SILVA, M.F., SOARES, J.C., WOLTERS, H., RODRÍGUEZ, A., SANZ-MAUDES, J., "RBS Characterization of Iridium Silicides Formed by RTA in Vacuum", *Nucl. Instr. and Meth.* **B113** (1996) 279-283.
9. SILVA, R.C., SOUSA, R.C., CONDE, O., SILVA, M.F., SOARES, J.C., "Formation of Al₁₃Cr₂ Intermetallic Phase by Cr Ion Implantation", *Surface & Coatings Technology* **83** (1996) 60-64.
10. ALFONSO, J.E., MARTIN, M.J., MENDIOLA, J., RUIZ, A., ZALDO, C., SILVA, M.F., SOARES, J.C., "Bi₁₂(Ga_xBi_{1-x})O_{19.5} Optical Waveguides Grown by Pulsed Laser Deposition", *J. Appl. Phys.* **79** (1996) 8210-8215.
11. LASSALETTA, G., GONZÁLEZ-ELIPE, A.R., JUSTO, A., FERNÁNDEZ, A., AGER, F.G., RESPALDIZA, M.A., SOARES, J.C., SILVA, M.F., "Thermal and Photochemical

- Methods for the Preparation of Thin Films of Cermet Materials”, *J. Mat. Sci.* **31** (1996) 2325-2332.
- 12.SERNA, R., BLASCO, A., MISSANA, T., SOLÍS, J., AFONSO, C.N., RODRÍGUEZ, A., RODRÍGUEZ, T., SILVA, M.F., “All Laser-assisted Heteroepitaxial Growth of $\text{Si}_{0.8}\text{Ge}_{0.2}$ on Si(100): Pulsed Laser Deposition and Laser Induced Melting-Solidification”, *Appl. Phys. Letters* **68** (1996) 1781-1783.
- 13.CORREIA, J.G., “Radioactive Ion Beams for Solid State Research”, *Nucl. Instr. and Meth.* **B113** (1996) 501-506.
- 14.MCHARGUE, C.J., JOSLIN, D.L., WHITE, C.W., SILVA, M.F., ALVES, E., SOARES, J.C., “Ion Beam Mixing of Chromium or Zirconium Films with Sapphire”, *Surface and Coatings Technology* **83** (1996) 151-155.
- 15.HERREROS, B., LIFANTE, G., KLING, A., SOARES, J.C., , SILVA, M.F., TWONSEND, P.D., CHANDLER, P.J., OLIVARES, J., CABRERA, J.M., “RBS/Channeling Study of Ion-Implanted and Proton-Exchanged $\text{LiNbO}_3:\text{Nd}^{3+}:\text{MgO}$ Planar Waveguides”, *Optical Materials* **6** (1996) 281-286.
- 16.CHIANG, C.I., MEYER, O., SILVA, R.C., “The Modification of Mechanical Properties and Adhesion of Boron Carbide Sputtered Films by Ion Implantation”, *Nucl. Instr. and Meth.* **B117** (1996) 408-414.
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- 18.BARRADAS, N.P., SOARES, J.C., SILVA, M.F., PLASKETT, T.S., FREITAS, P.P., “Rutherford Backscattering Study of Thin Oxide Layers Prepared by Reactive Magnetron Sputtering”, *Nucl. Instr. and Meth.* **B118** (1996) 626-629.
- 19.ALVES, E., SILVA, M.F, MARQUES, J.G., CORREIA, J.G., SOARES, J.C., FREITAG, K., “Low Temperature Epitaxial Regrowth of Mercury Implanted Sapphire”, *Nucl. Instr. and Meth.* **B120** (1996) 248-251.
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- 21.SOCHINSKII, N.V., MUÑOZ, V., BELLANI, S., VIÑA, L., DIÉGUEZ, E., ALVES, E., SILVA, M.F., SOARES, J.C., BERNARDI, S., “Substrate Effect on CdTe MOVPE Layers: Surface Morphology and Rutherford Backscattering and Photoluminescence Spectra”, *App. Phys. Lett.*, in press.
- 22.FORKEL-WIRTH, D., ACHTZIGER, N., BURCHARD, A., CORREIA, J.C., DEICHER, M., GRILLENBERGER, J., GOTTSCHALCK, H., LICHT, T., MAGERLE, R., REISLÖHNER, U., RÜB, M., TOULEMONDE, M., WITTHUHN, W. and the ISOLDE

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25. LI, S., FREITAS, P.P., CARDOSO, S., SOARES, J.C., ALMEIDA, B., SOUSA, J.B., "[FeTaN/TaN] Soft Multilayers for Write Head Pole Pieces", *Nucl. Instr. and Meth. B*, in press.
26. MCHARGUE, C., JOSLIN, D.L., HUNN, J.D., ALVES, E., SILVA, M.F., SOARES, J.C., "Etching of Amorphous Al₂O₃ Produced by Ion Implantation", *Nucl. Instr. and Meth. B*, in press.
27. CORREIA, J.G., MARQUES, J.G., ALVES, E., FORKEL-WIRTH, D., JANH, S.G., RESTLE, M., DALMER, M., HOFSSASS, H., BHARUTH-RAM, K. and ISOLDE collaboration, "Microscopic Studies of Implanted ⁷³As in Diamond: γ -e PAC and Emission Channeling Measurements", *Nucl. Instr. and Meth. B*, in press.
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30. SPRIANO, S., ANTONIONE, C., DOGLIONE, R., BATTEZZATI, L., CARDOSO, S., SOARES, J.C., SILVA, M.F., "Crystallization and Mechanical Behaviour of Bulk Zr-Ti-Ni-Cu-Be Metallic Glasses", *Philosophical Magazine Letters*, in press.
31. CARVALHO, D., CARDOSO, S., VILAR, R., "Amorphisation of Zr₆₀Al₁₅Ni₂₅ Surface Layers by Laser Processing for Corrosion Resistance", *Scripta Materialia*, in press.
32. KLING, A., SOARES, J.C., SILVA, M.F., "Computer Simulation of Channeling Spectra with the CASSIS Program", *Rad. Eff. Def. Sol.*, in press.
33. KLING, A.A., MARQUES, J.G., SOARES, J.C., SILVA, M.F., DIÉGUEZ, E., AGULLÓ-LOPEZ, F., "Valence Effect on the Incorporation of Tungsten Implanted Into Lithium Niobate", *Nucl. Instr. Meth. B*, in press.

Conference Proceedings

1. SILVA, M.R., MELO, A.A., SOARES, J.C., SILVA, M.F., MOONS, R., LANGOUCHE, G., VANTOMME, A., CONDE, O., CHENG, L.Y., KUNG, H., "Temperature Dependence and Annealing Behaviour of Hf Implanted (100)Si: HfSi₂ Synthesis", *Mat. Res. Soc. Symp. Proc.* **402** (1996) 593-597.
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5. MARQUES, J.G., MELO, A.A., SOARES, J.C., ALVES, E., SILVA, M.F., FREITAG, K., "Temperature Dependence of the Hyperfine Fields of ¹⁸¹Ta in Single Crystalline Cobalt", Proc. 10th Int. Conf. on Hyperfine Interactions, Leuven, 1995, *Hyperfine Interactions (C)* **1** (1996) 33.
6. MARQUES, J.G., JESUS, C.M., MELO, A.A., SOARES, J.C., DIÉGUEZ, E., AGULLÓ-LÓPEZ, F., "PAC Study of the Interaction Between Impurity Sites in LiNbO₃ Doped with Hf and Mg", Proc. 10th Int. Conf. on Hyperfine Interactions, Leuven, 1995, *Hyperfine Interactions (C)* **1** (1996) 348.
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9. DOBLER, M., REUTHER, H., BARRADAS, N.P., "Conversion Electron Mössbauer Spectroscopy Studies of FeSi and FeSi₂", *Hyperfine Interactions*, in press.
10. DALY, S.E., HENRY, M.O., ALVES, E., SOARES, J.C., GWILLIAM, R., SEALY, B.J., FREITAG, K., VIANDEN, R., STIEVENARD, D., "Rutherford Backscattering and Photoluminescence Studies of Er Implanted GaAsMat", *Mat. Res. Symp. Proc.* **Vol. 422** (1996) 173-178.
11. HENRY, M.O., DALY, S.E., FREEHIL, C.A., MCGLYNN, E., DONAGH, C.MC., ALVES, E., SOARES, J.C., FORKEL, D., "A Photoluminescence Study of Gold and

Platinum Related Defects in Silicon Using Radioactive Transformations”, ICPS_23 Berlin’96 (in press).

12. MARQUES, J.G., KLING, A., SOARES, J.C., SILVA, M.F., DIÉGUEZ, E., AGULLÓ-LOPEZ, “Thermal Neutron Irradiation of LiNbO₃ Crystals Doped with Hf and Hf,Mg”, *Mat. Res. Symp. Proc.*, in press.

Special Publications, Book Chapters, Others

1. VAZ, F., REBOUTA, L., SILVA, M.F., SOARES, J.C., “Thermal Oxidation of Ternary and Quaternary Nitrides of Titanium, Aluminium and Silicon”, in “Protective Coatings and Thin Films: Synthesis, Characterization and Applications” ed Y. Pauleau and P. Barnas, Kluwer Acad. Publ., Dordrecht, (1996) pp.501-510.

Communications to Conferences

1. VAZ, F., REBOUTA, L., ANDRITSCHKY, M., SILVA, M.F., SOARES, J.C., “Thermal Oxidation of Ti_{1-x}Al_xN Coatings in Air”, *International Symposium on Nitrides*, St. Malo, France, May 28 - June 1, 1996.
2. TAVARES, C.J., REBOUTA, L., ALMEIDA, B., BESSA E SOUSA, J., SILVA, M.F., SOARES, J.C., “DEPOSITION and Characterization of Multilayered TiN/ZrN Coating”, *10th International Conference on Thin Films*, Salamanca, Spain, 23-27 September 1996.
3. VAZ, F., REBOUTA, L., ANDRITSCHKY, M., SILVA, M.F., SOARES, J.C., “Oxidation Resistance of (Ti,Al,Si)N Coatings in Air”, *Fifth International Conference on Plasma Surface Engineering PSE’96*, Garmisch Partenkirchen, Germany, 9-13 September 1996.
4. REDONDO, L.M., SILVA, M.F., MELO, A.A., “Mass Spectrometry in a High Current Ion Implantor” (in Portuguese), *FÍSICA-96 – 10th National Conference of Physics*, Faro, 13-17 September 1996, XI-PO(1), pp. 528-529.
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11. RAMOS, R., REDONDO, L., ALVES, E., SILVA, M.F., MELO, A.A., SOARES, J.C., “Study of the Amorphization and Epitaxial Regrowth of Hf Implanted Silicon Crystals” (in Portuguese), *FÍSICA-96 – 10th National Conference of Physics*, Faro, 13-17 September 1996.

Research of Materials using Neutrons

Publications in Journals

1. FALCÃO, A.N., PEDERSEN, J.S., MORTENSEN, K., “Polydimethylsiloxane Networks at Equilibrium Swelling: Extracted and Nonextracted Networks”, *Macromolecules* **29** (1996) 809-818.
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Internal Reports

1. ALVES MARQUES, M., MARGAÇA, F.M.A, FABI, P., TOMKINSON, J., BARROS MARQUES, M.I., “Investigation of Librational Motions of Water Molecules in Concentrated Solutions of Ionic Salts” in *ISIS 96 - The ISIS Facility Annual Report*, RAL-TR-96-050, Vol.II, A321 (1996).
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RADIOISOTOPES AND RADIATION IN HEALTH SCIENCES

Radiopharmaceutical Development

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9. COSTA OLIVEIRA, J., MARTINHO, E., “Nuclear Power Stations and Man”, Booklet to be published
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RPI Dosimetry

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1. MASCARENHAS, F., GONÇALVES, I.C., RAMALHO, A., PERTUSA, J., LORENTE, M.J., IRLES, A., ALCOBER, COLOMA, V., ALCOBER BOSCH, V., CASTRO, M., TOSCANO RICO, J., “The Boron Neutron Capture Therapy - BNCT. The development of the Ibero BNCT Group”, *Acta Portuguesa de Radiologia*, in press.

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INDUSTRIAL TECHNOLOGIES

Nuclear Instruments and Methods

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1. OLIVEIRA, C., SALGADO, J., CARVALHO, F.G., “Optimization of PGNAA Instrument Design for Cement Raw Materials Using the MCNP Code”, *J. Radioanal. and Nuclear Chemistry*, in press.

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