

## New Materials and Compounds

### Advanced Materials Research Group

#### Books and Book Chapters

A. Kling, Channelling, in: 'Encyclopedia of Physics, 3<sup>rd</sup> Edition', R.G. Lerner, G.L. Trigg (Eds:), Wiley-VCH, Weinheim, Germany, 2005, ISBN 3-527-40554-2, pp. 268-272.

#### Journals

A. Fonseca, E. Alves, J.P. Leitão, N.A. Sobolev, M.C. Carmo, A.I. Nikiforov, Optical and structural study of Ge/Si quantum dots on Si(1 0 0) surface covered with a thin silicon oxide layer, *Mat. Sci. and Eng.: B*, 124-125 (2005) 462-465,

A. Fonseca, N. Franco, E. Alves, N. P. Barradas, J.P. Leitão, N.A. Sobolev, D.F. Banhart, H. Presting, V.V. Ulyanov, A.I. Nikiforov, High resolution backscattering studies of nanostructured magnetic and semiconducting materials, *Nucl. Instr. Meth. B241* (1-4): 454-458, Dec 2005.

A. Kling, J.C. Soares, C. Prieto, J. Jimenez, A. Rodríguez, J. Sangrador, T. Rodríguez, Ion Beam Analysis of the Dry Thermal Oxidation of Thin Polycrystalline SiGe Films, *Nucl. Instr. Meth. B240* (2005) 405-408.

A. Mitric, V. Corregidor, L.C. Alves, A. Amariei, C. Díaz-Guerra, J. Piqueras, Synthesis and characterisation of GaSb and GaInSb feed materials, *J. Crystal Growth*, 275, 1-2 (2005) e601-e607.

A. Paúl, E. Alves, L.C. Alves, C. Marques, R. Lindau, J.A. Odriozola, Microstructural characterization of Eurofer-ODS RAFM steel in the normalized and tempered condition and after thermal aging in simulated fusion conditions, *Fusion Engineering and Design*, 75-79: 1061-1065, Nov 2005.

A. Paúl, E. Alves, L.C. Alves, C. Marques, R. Lindau, J.A. Odriozola, Microstructural characterization of Eurofer-ODS RAFM steel in the normalized and tempered condition and after thermal aging in simulated fusion conditions, *Fusion Engineering and Design*, 75-79: 1061-1065, Nov 2005.

A.L. Stepanov, C. Marques, E. Alves, R.C. Da Silva, M.R. Silva, R.A. Ganeev, A.I. Rysanyansky, T. Usmanov, Nonlinear optical properties of gold nanoparticles synthesized by ion implantation in sapphire matrix, *Tech. Phys. Lett.* 31 (8) :702-705, 2005

A.R. Ganeev, A.I. Rysanyansky, A.L. Stepanov, C. Marques, R.C. Da Silva, E. Alves, Application of RZ-scan technique for investigation of nonlinear refraction of sapphire doped with Ag, Cu, and Au

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A.R. Ramos, C. Marques, E. Alves, A.C. Marques, R.M. Almeida, Stability of erbium and silver implanted in silica-titania sol-gel films, *Nucl. Instr. Meth. B240* (1-2): 415-419 Oct 2005.

C. Marques, A. Wemans, M.J.P. Maneira, A. Kozanecki, R.C. Da Silva, E. Alves, Site location and optical properties of Eu implanted sapphire, *Nucl. Instr. Meth. B240* (1-2): 409-414 Oct 2005.

C. Pascual-Izarra, N. P. Barradas, G. García, A. Climent-Font, Experimental stopping forces for He, C, O, Al and Si ions in aluminum oxide in the energy range of 40 to 1250 keV/nucleon, *Nucl. Instr. Meth. B239* (2005) 135-146.

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F. Vaz, J. Ferreira, E. Ribeiro, L. Rebouta, S. Lanceros-Mendez, J. A. Mendes, E. Alves, P. Goudeau, J.P. Riviere, F. Ribeiro, I. Moutinho, K. Pischow, J. De Rijk, Influence of nitrogen content on the structural, mechanical and electrical properties of TiN thin films, *Surf. Coat. Tech.* 191 (2-3): 317-323, Feb 2005

G. Abrasonis, J.P. Rivière, C. Templier, L. Pranevicius, N.P. Barradas, Flux effect on the ion beam nitriding of austenitic stainless-steel AISI 304L, *J. Appl. Phys.* 97 (2005) 124906 1-15.

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J.P. Leitão, A. Fonseca, N.A. Sobolev, M.C. Carmo, N. Franco, A.D. Sequeira, T.M. Burdaev, V.A. Kurbatov, M.M. Rzaev, A.O. Pogosov, N.N. Sibeldin, V.A. Tsvetkov, H. Lichtenberger, F. Schaffler, Low-temperature molecular beam epitaxy of Ge on Si, *Mat.*

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- N. Franco, I.V. Yavorovskiy, A. Fonseca, J.A.A. Gouveia, C. Marques, E. Alves, R.A. Ferreira, P.P. Freitas, N.P. Barradas, Rutherford backscattering and X-ray reflectivity analysis of tunnel barriers, *Nucl. Instr. Meth. B* 240 (1-2): 365-370, Oct 2005.
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- ### Conference Proceedings
- A.R. Ramos, E. Alves, L. Ranieiro, E. Fortunato, I. Ferreira, R. Martins, Characterization of nanocrystalline silicon carbide films, S. Zhang, L. Pereira, *20<sup>th</sup> European Photovoltaic Solar Energy Conf.*, 6-10 June 2005, Barcelona, Spain.
- C. Prieto, M. Avella, J. Jimenéz, A. Rodríguez, J. Sangrador, T. Rodríguez, A. Kling, Study of the oxidation of polycrystalline SiGe: formation of Ge nanocrystals and their related luminescence, *Mater. Res. Soc. Symp. Proc.* 862 (2005) A8.3.1 – A8.3.6.
- M. Avella, C. Prieto, J. Jimenéz, A. Rodríguez, J. Sangrador, T. Rodríguez, A. Kling, Luminescence in Ge Nanocrystals Formed by Dry and Wet Oxidation of SiGe Films, *Proc. Soc. Photo-opt. Instr. Eng.* 5838 (2005) 276-284.
- ### Communications
- E. Alves, Advances on rare earth doping of wide bandgap semiconductors, *21<sup>st</sup> Int. Conf. on Amorphous and Nanocrystalline Semiconductor*, Lisbon, Portugal, 4-9 Sep., Invited talk.
- E. Alves, Structural and Optical studies on rare earth doped wide bandgap semiconductors, *2<sup>nd</sup> ASPECT Workshop on Advanced Spectroscopy*, Kazimierz, Polónia, 29 Sep to 2 Oct., invited talk.
- K. Lorenz, N.P. Barradas, E. Alves, D. Jalabert, B. Daudin, RBS/Channelling analysis of GaN quantum dots in AlN Multilayers, *17<sup>th</sup> Int. Conf. on Ion Beam Analysis (IBA 17)*, Seville, Spain, 26Jun–1July, invited talk.
- K. Lorenz, U. Wahl, E. Alves, E. Nogales, S. Dalmasso, R.W. Martin, K.P. O'Donnell, T. Wojtowicz, P. Ruterana, S. Ruffenach, O. Briot, and the RENIBEL NETWORK, High Temperature Annealing of Rare Earth Implanted GaN-Films, Structural and Optical Properties, *Spring Meeting European Materials Research Society (E-MRS)*, Strasbourg, France, May 31 – June 3, invited talk.
- N.P. Barradas, Quantum dots simulation in RBS, *Workshop on Nanomaterials for Applications in Devices*, ITN, Portugal, 18 April, invited talk.
- U. Wahl, High-lights of solid state physics at ISOLDE, *NuPAC - Nuclear Physics and Astrophysics at CERN*, Geneva, Switzerland, 10-12Oct, invited talk
- U. Wahl, Recent emission channelling experiments in GaN and ZnO, *Seminar, University of Göttingen*, Göttingen, Germany, 17 Jun, invited talk.
- U. Wahl, Semiconductor physics with radioactive isotopes at ISOLDE, *2<sup>nd</sup> ASPECT Workshop on Advanced Spectroscopy Applications*, The ASPECT Centre of Excellence at the Institute of Physics, Kazimierz Dolny, Poland, 29 Sep - 2 Oct, invited talk.
- A. Kling, M.I. Ortiz, A.C. Prieto, A. Rodríguez, T. Rodríguez, J. Jiménez, C. Ballesteros, J.C. Soares, Role of the SiO<sub>2</sub> Buffer Layer Thickness in the Formation of Si/SiO<sub>2</sub>/nano-SiGe/SiO<sub>2</sub> Structures by Dry Oxidation, *IBA 17*, Sevilla, Spain, 27Jun–1Jul
- Kling, RBS Analysis of Nanometric SiGe Structures, *Workshop on Nanomaterials for Applications in Devices*, Sacavém, 18 April, oral.
- B. de Vries, A. Vantomme, U. Wahl, E. Rita, J.G. Correia and the ISOLDE Collaboration, Lattice site location of Lu implanted into GaN, *E-MRS 2005 Spring Meet.*, Strasbourg, France, 31 May –3 Jun, oral
- B. de Vries, D. Smeets, V. Matias, U. Wahl, S. Ruffenach, O. Briot, A. Vantomme, Determination of the mosaic tilt and twist of GaN and AlN samples, *Workshop on GaN-based Materials, Leuven-Peking cooperation*, Leuven, Belgium, Feb., oral.
- C. Marques, N. Franco, L.C. Alves, R.C. Da Silva, E. Alves, Optical and structural behaviour of Cu implanted sapphire, *Surface Modification of Materials by Ion Beams*, Istanbul, Turkey, 4 - 9 Sep, oral.
- E. Alves, C. J. Mchargue, L. C. Onoye, C. Marques, Structure and optical properties of sapphire implanted with boron at room temperature and 1000° C, *13<sup>th</sup>*

- Conf. Radiation Effects in Insulators*, Santa Fe USA, 29 Aug – 2 Sep, oral.
- E. Alves, L.C. Alves, N. Franco, M.R. Da Silva, A. Paúl, Structural and oxidation studies of titanium beryllides, *7<sup>th</sup> IEA Int. Workshop on Be Technology for Fusion*, Santa Barbara, USA, 29 Nov–2 Dec, oral.
- E. Nogales, K. Lorenz, K. Wang, I. Roqan, R.W. Martin, V. Katchkanov, U. Wahl, E. Alves, S. Hernández, S. Dalmasso, K.P. O'donnell, S. Ruffenach, O. Briot and the RENIBEL Network, Luminescence and structural properties of rare-earth implanted gallium nitride, *UK Nitrides Consortium Conf.*, Manchester, U.K., 13-14 Jan., oral.
- G. Lavareda, C. Nunes De Carvalho, E. Fortunato, A.R. Ramos, E. Alves, O. Conde, A. Amaral, Transparent thin film transistors based on indium oxide semiconductor, *1<sup>st</sup> Conf. Advances in Optical Materials*, Tucson, USA, 12-15 Oct, oral.
- K. Lorenz, E. Alves, E. Wendler, W. Wesch, Damage Formation and Annealing at Low Temperatures in Ion Implanted ZnO, *E-MRS 2005 Spring Meeting*, Strasbourg, France, May 31–3 Jun, oral.
- K. Lorenz, E. Alves, M. Soares, T. Monteiro, M. Peres, Optical doping of AlN by Er implantation, *MATERIAIS 2005*, Aveiro, Portugal, 20-23 Mar, oral.
- K. Lorenz, N. Franco, E. Alves, I.M. Watson, E. Nogales, R.W. Martin, K.P. O'Donnell, P.J.M. Smulders, Combined RBS/Channelling and HRXRD Study to Access Structural Properties and Lattice Strain of AlInN Epitaxial Layers Grown on GaN, *Fall Meeting of Materials Research Society, Symp. OO: Growth, Modification, and Analysis by Ion Beams at the Nanoscale*, Boston, USA, Nov 28 – 2 Dec, oral.
- K. Lorenz, U. Wahl, E. Alves, T. Wojtowicz, P. Ruterana, S. Dalmasso, E. Nogales, R.W. Martin, K.P. O'Donnell, S. Ruffenach, O. Briot, Rare earth implantation in GaN – an alternative route to develop integrated, all-nitride light-emitting devices, *2005 Spring Meeting of German Physical Society, Symp. HL: Halbleiter*, Berlin, Germany, 4-9 March, oral.
- M. Vilarigues, A.P. Matos, R.C. Da Silva, Potash glass corrosion: from the 15<sup>th</sup> century to the laboratory, *Int. Conf. on Glass Science in Art and Conservation*, Lisbon, Portugal, Sep., oral.
- U. Wahl, E. Alves, J.P. Araújo, J.G. Correia, E. Rita, J.C. Soares, and the ISOLDE Collaboration, Combined studies of the lattice location and magnetic properties of implanted Fe in ZnO, *IBA 17*, Sevilla, Spain, 26 Jun – 1 Jul, oral.
- U. Wahl, E. Rita, J.G. Correia, E. Alves, J.C. Soares and the ISOLDE Collaboration, Substitutional incorporation of implanted Fe in ZnO, *E-MRS 2005 Spring Meet.*, Strasbourg, France, 31 May –3 Jun, oral
- V.S. Amaral, U. Wahl, J.P. Araújo, A.M.L. Lopes, E. Rita, J.G. Correia, Local probe studies on solid state materials, *Materiais 2005*, Aveiro, 20-23 March, oral.
- A. Amaral, G. Lavareda, P.M. Sousa, A.R. Ramos, E. Alves, C. Nunes De Carvalho, On the role of transparent semiconductor films for transparent electronics by In and In<sub>2</sub>O<sub>3</sub> evaporation, *21<sup>st</sup> Int. Conf. Amorphous and Crystalline Semiconductor*, Lisbon, Portugal, 4-9 Sep, poster.
- A.C. Marques, U. Wahl, J.G. Correia, E. Rita, J.C. Soares, and the ISOLDE Collaboration, Lattice location and perturbed angular correlation studies of implanted Ag in SrTiO<sub>3</sub>, *IBA 17*, Sevilla, Spain, 26 Jun – 1 July, poster.
- A. Fonseca, E. Alves, J.P. Leitão, N.A. Sobolev, M.C. Carmo, A.I. Nikiforov, Ion beam analysis of Ge/Si dots grown on ultrathin SiO<sub>2</sub> interlayers, *Materials 2005*, Aveiro, Portugal, 20-23 March, poster.
- A. Fonseca, E. Alves, J.P. Leitão, N.A. Sobolev, M.C. Carmo, A.I. Nikiforov, Structural and optical study of Ge/Si quantum dots on Si(001) surface covered with a thin silicon oxide layer, *E-MRS 2005 Spring Meeting*, Strasbourg, France, May 31 – 3 June, poster.
- A. Fonseca, E. Alves, N.P. Barradas, J.L. Leitão, N.A. Sobolev, M.C. Carmo, A.I. Nikiforov, H. Presting, RBS/Channelling study of buried Ge quantum dots grown in a Si layer, *IBA 17*, Seville, Spain, Jun26–1 Jul, poster.
- A. Fonseca, E. Alves, N.P. Barradas, J.P. Leitão, N.A. Sobolev, M.C. Carmo, A.I. Nikiforov, Structural and Optical Characterization of Ge quantum dots, *2<sup>nd</sup> ASPECT Workshop on Advanced Spectroscopy*, Kazimierz Dolny, Poland, Sep 29–2 Oct, poster.
- Kling, M.I. Ortiz, J. Sangrador, A. Rodríguez, T. Rodríguez, C. Ballesteros, J.C. Soares, Combined RBS and TEM Characterization of Nano-SiGe Layers Embedded in SiO<sub>2</sub>, *IBA 17*, Sevilla, Spain, Jun27–1 Jul, poster.
- A. Manuaba, F. Pászti, A.R. Ramos, N.Q. Khanh, Z. Zolnai, A. Tunyogi, E. Szilágyi, Effect of pre-implanted oxygen in Si on the retention of implanted He, *IBA 17*, Sevilla, Spain, Jun 26 – 1 Jul, poster.
- A. Paúl, L.C. Alves, E. Alves, J.A. Odrizola, Microstructural characterisation of reduced activation EUROFER ODS alloy after long-term annealing, *12<sup>th</sup> Int. Conf. on Fusion Reactor Material*, Santa Barbara, USA, 5-10 Dec, poster.
- A.C. Marques, U. Wahl, J.G. Correia, E. Rita, J.C. Soares, Emission channelling lattice location experiments in SrTiO<sub>3</sub>, *2<sup>nd</sup> ASPECT Workshop on Advanced Spectroscopy Applications*, The ASPECT Centre of Excellence at the Institute of Physics, Kazimierz Dolny, Poland, 29 Sep.–2 Oct, poster.
- A.G. Rolo, P. Caldelas, A. Chahboun, O. Conde, E. Alves, A.R. Ramos, M.I. Vasilevskiy, M.J.M. Gomes, CdS, CdTe and Ge nanocrystals embedded in dielectric matrices by RF-sputtering technique, *Fisica 2005 – Física para o Século XXI*, Porto, Dec, poster.
- B. de Vries, V. Matias, U. Wahl, J.G. Correia, S. Ruffenach, O. Briot, A. Vantomme, Influence of the

- crystal mosaicity of nitrides on axial channelling, *IBA 17*, Sevilla, Spain, 26 Jun – 1 Jul, poster.
- C. Marques, L.C. Alves, R.C. Da Silva, A. Kozanecki, E. Alves, Ionoluminescence studies of Eu implanted Sapphire, *IBA 17*, Sevilla, Spain, Jun 26 – 1 Jul, poster.
- C. Marques, N. Franco, R.C. Da Silva, A. Wemans, M.J.P. Maneira, E. Alves, Characterization of nickel implanted  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>, *Materials 2005*, Aveiro, Portugal, 20-23 Mar, poster.
- C. Marques, N. Franco, R.C. Da Silva, C. Mchargue, E. Alves, Nanoprecipitates produced by ion implantation of Zn in  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>, *5<sup>th</sup> Iberian Vacuum Meeting*, Guimarães, Portugal, 18-21 Sep, poster.
- E. Alves, C. Marques, T. Monteiro, L.C. Alves, R.C. Da Silva, Optical and structural behaviour of Mn implanted sapphire, *13<sup>th</sup> Conf. Radiation Effects in Insulators*, Santa Fe USA, 29 Aug–2 Sep, poster.
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## Theses

### PhD

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