

Prof. Roberto Fornari – short CV

Education and employments

- Roberto Fornari graduated in Physics with honours (110/110 e Lode) in 1980 at Parma University.
- 1981-2003 he was at Institute for Electronic and Magnetic Materials of the National Research Council (MASPEC, now IMEM-CNR); enrolled as Research Scientist, he became in 1999 Senior Scientist (Primo Ricercatore), and then Director of Research (Dirigente di Ricerca) in 2001.
- 2003-2013 he was Director of the Leibniz Institute for Crystal Growth (IKZ) and Full Professor at the Institute of Physics of the Humboldt University, Berlin (joint position).
- In October 2013 he joined the University of Parma as Full Professor (accepted a direct call as eminent scientist abroad, L. 240/2010; position covered 50% by MIUR).
- Presently Professor at Dept. of Mathematical, Physical and Computer Sciences (Fisica della Materia, Fis/03).

Teaching

- From 2013 he is teaching "Physics and Technology of Materials" to Master students of Physics, and "Classical Mechanics (Fisica 1)" to Bachelor students of Chemistry, Univ. Parma.
- 2003-2013 he taught "Fundamentals and methods of crystal growth" at TU Cottbus and Humboldt University Berlin.
- Lecturer at about 30 international/national schools on materials science, crystal growth, and semiconductor physics.
- Lecturer at the European School of Advanced Studies in Materials Science, College of Pavia, during 1998-2004.
- Lecturer and Faculty member at Master on Crystallography and Crystallisation, Univ. Intern. Menendez Pelayo, Madrid. Courses held at Univ. of Granada and Sevilla (Spain) during 2008-2011
- Overseas Visiting Professor, Anna University, Chennai, India 2010 - present
- Supervisor of 28 undergraduate and PhD theses

Research

- At IMEM-CNR: Different projects on bulk and epitaxial semiconductors for advanced applications (GaAs, InP, GaN and InGaN)
- At IKZ, Berlin: He launched and coordinated projects on bulk AlN and GaN, solar silicon, novel perovskites, piezo-electric oxides, semiconducting oxides, silicon nano-structures.
- At Physics Dept., Univ of Parma: Coordinates the research activity on gallium oxide and related alloys for power electronics and UV-detectors.
- He has been directly responsible of research projects for total 2.7 million Euro.

Awards

- Recipient of Premio Mammi 2017 of the Italian Crystallographic Association (AIC).
- Two times invited to present his results in USAF laboratories in the frame of the Window-on-Science programme of AFOSF, reserved to "distinguished foreign researchers"; 1992, 1995
- Recipient of Global Initiative for Academic Networks (GIAN 2017) grant to become faculty of Higher Education initiatives at India's primary universities.

Management experience

- Director Leibniz Institute for Crystal Growth, Berlin (Germany), period 2003- 2013.
- Vorstand Forschungsverbund Berlin eV (Executive Board of Berlin Research Alliance, administrates eight Leibniz Institutes in Berlin; total budget 140 million Euro, staff about 1800; CEO 2009-2011, Councillor 2003-2009 and 2011 – 2013
- Delegate of MASPEC-CNR Director at Comitato Area di Ricerca di Bologna and Deputy Director (FF) when the Director was on leave; several months during 1995, 1996 and 2000.
- From 1 January 2017 Coordinator of the Physical Unit of the Dept. Mathematical, Physical and Computer Sciences at UNIPR

Activities in scientific societies, panels, commissions and conference committees

- Chair of 13 international conferences and 4 schools
- Member Programme/Advisory Committee of over 60 international conferences.
- Sezione Crescita Cristalli della Società Italiana di Cristallografia (AIC): Elected member, Triennia 1994-97 and 1997-2000; Chairman 2000-03
- Intern. Organization for Crystal Growth (IOCG): President 2010-2016; Vice-president 2007-10, Member Executive Comm. 2001-06.
- International Union of Crystallography (IUCR) - Commission on Crystal Growth and Characterisation of Materials: Chairman Triennia 1999-02, 2002-05; Councillor Triennium 2005-08
- IUCR Representative to Committee on Space Research (COSPAR) of the Intern. Council for Science (ICSU), Period 2000 – 2005
- European Materials Research Society (E-MRS); Member Executive Committee 2011-2017

- Scientific Council of MIST-ER (Regional Laboratory of micro- and submicro-technologies, Region Emilia-Romagna), Member 2014 – present

Publications

RF is author/co-author of about 220 papers, about 160 in international journals and some 60 in conference proceedings. He gave 51 invited and plenary talks at international conferences. He is the holder of ten patents, wrote twelve book chapters and invited reviews.

His publications have been cited about 2200 times, H index 23 (Scopus); about 2700 times, H index 27 (Google Scholar)

Editorial activity

Presently associate editor di J. Crystal Growth, Crystal Research and Technology, J. Optoelectronics and Advanced Materials.

From 1995 to 2008 he was editor of J. Mater. Sci. Eng. B.

RF edited nine books and conference proceedings. The major work is "Comprehensive Semiconductor Science and Technology", co-edited with P. Bhattacharya e H. Kamimura, Elsevier, 2011; six volumes.

- 1) Z. Galazka, R. Uecker, K. Irmscher, D. Schulz, D. Klimm, M. Albrecht, M. Pietsch, S. Ganschow, A. Kwasniewski and **R. Fornari**: "Melt growth, characterization and properties of bulk In_2O_3 single crystals", *J. Cryst. Growth* 362 (2013) 349-352
- 2) Z. Galazka, Irmscher, M. Pietsch, T. Schulz, R. Uecker, D. Klimm, **R. Fornari**, "Effect of heat treatment on properties of melt-grown bulk In_2O_3 single crystals", *Cryst.Eng.Comm.* 15 (2013) 2220-2226
- 3) R. Zwierz, S. Golka, K. Kachel, D. Siche, **R. Fornari**, P. Sennikov, A. Vodopyanov, A.V. Pipa: „Plasma-enhanced growth of GaN single crystalline layers from Ga vapour“, *Crystal Res. Technol.* 48 (2013) 186-192
- 4) D. Gogova, P. P. Petrov, M. Buegler, M. R. Wagner, C. Nenstiel, G. Callsen, M. Schmidbauer, R. Kucharski, M. Zajac, R. Dwilinski, M. R. Phillips, A. Hoffmann and **R. Fornari**: „Structural and optical investigations of non-polar (1-100) GaN grown by the ammonothermal method“, *J. Appl. Phys.* 113 (2013) 203513
- 5) Ch. Kudla, A.T.Blumenau, F.Büllesfeld, N.Dropka, Ch.Frank-Rotsch, F.Kiessling, O.Klein, P. Lange, W.Miller, U.Rehse, U.Sahr, M.Schellhorn, G.Weidemann, M.Ziem, G.Bethin, **R. Fornari**, M.Müller, J.Sprekels, V.Trautmann, P.Rudolph: “Crystallization of 640 Kg MC-silicon ingots under travelling magnetic field by using a heater-magnet module”, *J. Crystal Growth* 365 (2013) 54-58
- 6) K. Irmscher, M. Naumann, M. Pietsch, Z. Galazka, R. Uecker, T. Schulz, R. Schewski, M. Albrecht and **R. Fornari**: “On the nature and temperature dependence of the fundamental bandgap of In_2O_3 ”, *Phys. Stat. Sol. A211* (2014) 54-58; DOI 10.1002/pssa.201330184
- 7) Zbigniew Galazka, Reinhard Uecker, Detlef Klimm, Klaus Irmscher, Mike Pietsch, Robert Schewski, Martin Albrecht, Albert Kwasniewski, Steffen Ganschow, Detlev Schulz, Christo Gugushev, Rainer Bertram, Matthias Bickermann, and **Roberto Fornari**: „Growth, characterization, and properties of bulk SnO_2 single crystals“, *Phys. Stat. Sol. A211* (2014) 66-73; DOI 10.1002/pssa.201330020
- 8) Guenter Wagner, Michele Baldini, Daniela Gogova, Martin Schmidbauer, Robert Schewski, Martin Albrecht, Zbigniew Galazka, Detlef Klimm and **Roberto Fornari**: „Epitaxial growth of beta Ga_2O_3 by metal organic vapour phase epitaxy“, *Phys. Stat. Sol. A211* (2014) 27-33; DOI 10.1002/pssa.201330092
- 9) Dorothee Braun, Valentina Scherer, Christoph Janowitz, Zbigniew Galazka, **Roberto Fornari** and Recardo Mancke: „In-gap states of In_2O_3 single crystals investigated by Scanning Tunnel Spectroscopy“, *Phys. Stat. Sol. A211* (2014) 59-65; DOI 10.1002/pssa.201330089
- 10) Zbigniew Galazka, Reinhard Uecker and **Roberto Fornari**: “A novel crystal growth technique from the melt: Levitation-Assisted Self-Seeding Crystal Growth Method”, *J. Crystal Growth* 388 (2014) 61-69; DOI 10.1016/j.jcrysgro.2013.11.049
- 11) M. Albrecht, R.Schewski, K. Irmscher, Z. Galazka, T. Markurt, M. Naumann, T. Schulz, R. Uecker, **R. Fornari**, S.Meuret, M.Kociak: “Coloration and oxygen vacancies in wide band gap oxide semiconductors: Absorption at metallic nanoparticles induced by vacancy clustering – A case study on indium oxide”, *J. Appl. Phys.* 115 (2014) 053504; <http://dx.doi.org/10.1063/1.4863211>
- 12) Wan Sik Hwang, Amit Verma, Hartwin Peelaers, Vladimir Protasenko, Sergei Rouvimov, Huili Xing, Alan Seabaugh, Wilfried Haensch, Chris Van de Walle, Zbigniew Galazka, Martin Albrecht, **Roberto Fornari**, and Debdeep Jena: “High-Voltage Field Effect Transistors with Wide-Bandgap $\beta\text{-Ga}_2\text{O}_3$ Nanomembranes”, *Appl.Phys.Lett.* 104 (2014) 203111; <http://dx.doi.org/10.1063/1.4879800>
- 13) D. Gogova G.Wagner, M.Baldini, M.Schmidbauer, K.Irmscher, R.Schewski, Z.Galazka, M. Albrecht, **R.Fornari**: “Structural properties of Si-doped $\beta\text{-Ga}_2\text{O}_3$ layers grown by MOVPE”, *J. Cryst. Growth* 401 (2014) 665-669; <http://dx.doi.org/10.1016/j.jcrysgro.2013.11.056>
- 14) M. Baldini, D. Gogova, K. Irmscher, M. Schmidbauer, G. Wagner and **R. Fornari**: “Heteroepitaxy of $\text{Ga}_{2(1-x)}\text{In}_x\text{O}_3$ layers by MOVPE with two different oxygen sources”, *Cryst Res Technol.* 49 (2014) 552-557, DOI 10.1002/crat.201300410
- 15) F. Orlandi, F. Mezzadri, G. Calestani, F. Boschi and **R. Fornari**: “Thermal expansion coefficients of $\beta\text{-Ga}_2\text{O}_3$ single crystals”, *Appl. Phys. Express* 8 (2015) 111101, DOI 10.7567/APEX.8.111101
- 16) A. Parisini and **R. Fornari**: “Analysis of the scattering mechanisms controlling the electron mobility in $\beta\text{-Ga}_2\text{O}_3$ crystals”, *Semicond. Sci, Technol.* 31 (2016) 035023
- 17) Francesco Ricci, Francesco Boschi, Andrea Baraldi, Alessio Filippetti, Masataka Higashiwaki, Akito Kuramata, Vincenzo Fiorentini, **Roberto Fornari**: "Theoretical and experimental investigation of optical absorption anisotropy in $\beta\text{-Ga}_2\text{O}_3$ ", *J. Phys. Cond. Matt* (2016)
- 18) F. Boschi, M. Bosi, T. Berzina, E. Buffagni, C. Ferrari, **R. Fornari**: “Hetero-epitaxy of $\varepsilon\text{-Ga}_2\text{O}_3$ layers by MOCVD and ALD”, *J. Crystal Growth* 443 (2016) 25–30; DOI 10.1016/j.jcrysgro.2016.03.013
- 19) Francesco Mezzadri, Gianluca Calestani, Francesco Boschi, Davide Delmonte, Matteo Bosi, **Roberto Fornari**: “Crystal Structure and Ferroelectric Properties of $\varepsilon\text{-Ga}_2\text{O}_3$ Films Grown on (0001)-Sapphire”, *Inorg. Chem.* (2016), 12079-12084, DOI: 10.1021/acs.inorgchem.6b02244
- 20) I. Cora, F. Mezzadri, F. Boschi, M. Bosi, M. Caplovicova, G. Calestani, I. Dódony, B. Pécz, **R. Fornari**: “Real structure of $\varepsilon\text{-Ga}_2\text{O}_3$ and its relation to κ phase”, *Cryst. Eng. Comm.* DOI: 10.1039/C7CE00123A