



Curriculum Vitae

Lionel Santinacci

19.10.1974

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Main research interest

Materials science, microstructures, surface/interface, thin film characterization, scanning probe microscopies, electrochemistry, semi-conductor chemistry.

Education

- 1998-2002 PhD in Materials Science
At Swiss Federal Institute of Technology Lausanne, EPFL (Switzerland) and at the University of Erlangen-Nuremberg (Germany)
- 1997-1998 Diploma thesis in Materials Science, University of Marseille (France)
- 1994-1997 M. Sc. in Physical chemistry option Materials Science, University of Marseille (France)
- 1993-1994 B. Sc. in Physics and Chemistry, University of Toulon (France)
- 1991-1992 Maturity Certificate in Science, Institute St Mary, Toulon (France)

Scientific experience

- 09/1998-07/2002 PhD of materials science at Materials Science department of the Swiss Federal Institute of Technology Lausanne (CH) and at the Chair for Surface Science and Corrosion at the University of Erlangen-Nuremberg (D).
Subject: "Selective electrochemical reactions onto semi-conductive electrodes."
Methods: AFM and STM (observation and nano-scratching), Electrodeposition, capacitance measurements, micro-electrochemistry, Ellipsometry, AES and XPS, SEM and photolithography.
Collaboration with the Institute of Microstructural Sciences (IMS) of the National Research Council of Canada (NRC-Ottawa) on the growth of anodic oxide films on InP.
- 02/1998-06/1998 Diploma thesis in the Research Center for Crystal Growth Mechanisms (CRMC2-CNRS) Marseille (France).
Subject: "A quantitative study of metallic cluster morphology by scanning probe microscopies"
Methods: scanning probe microscopies (AFM, STM) et ultra-vacuum techniques.
- 1996-1997 Semester project in the Laboratory for Physical Chemistry of Materials, University of Marseille.
Subject: " Effects of additive on electrocrystallization of zinc on steel".
Training course in industry during 6 weeks at Chemetall Surface Treatment SA in Paris (France).
Subject: "Optimization of an industrial bath for Sn and Sn/Pb electroplating"

Teaching experience

- 01/1999-07/2000 (EPFL) Lab. Courses for undergraduate students in Materials Science.
- Lithography and fabrication of MOS transistor.
 - Nano-templates of porous anodic aluminum oxide.
- 09/2000-07/2001 (Uni-Erlangen) Lab. Courses for undergraduate students in Materials Science.
- Corrosion of materials.
- 09/2000-12/2000 Tutoring for thermodynamics lecture, undergraduate students.
- 01/2001-04/2001 Tutoring for electrochemistry lecture, undergraduate students.

Research Tutoring

- Diploma thesis
- T. Campanella, "Study of the feasibility of Cu nano-systems on Si.
 - H. Mokdad, "AFM induced nano-patterning of Si surfaces".
 - M. Kalloui, "Selective electrodeposition of CdS at semi-conductive electrodes",
- Semester projects
- S. Stauss, "Selective deposition of polyaniline on n-Si".
 - G. Rapillard, "Study of electrochemical deposition of Pd onto Si substrate for micro-systems fabrication".
 - E. Jud, "Pores formation on InP (100) by electrochemical anodization in halogenide electrolytes".
 - S. Ecoffey, "Study of selective electrochemical deposition of Au on silicon substrate".

Research activities

- Main subject Nano-patterning by selective electrochemical deposition onto AFM modified silicon surfaces.
- Methods:* AFM (observation, nano-scratching), electrodeposition of metal, polymers et semiconductor, oxide formation (thermal or anodic).
- Other subjects
- Pore formation and oxidation of InP.
 - Electron-beam lithography.

Oral presentations

- 2000 P. Schmuki, L. Santinacci, E. Jud and D. J. Lockwood
"Pore formation on InP and GaAs", *2nd international Conference on Porous Semiconductor Science and Technology*, Madrid, march 2000.
- L. Santinacci
"Selective electrochemical deposition of metals onto semiconductor surfaces",
University of Munich, October 2000.
- L. Santinacci, T. Djenizian et P. Schmuki
"AFM induced nanopatterning of Si surfaces", *in 2nd International Symposium on Pits and Pores: Properties and Significance for Advanced Materials*, 198th Meeting of the Electrochem. Soc., Phoenix, October 2000
- T. Djenizian, L. Santinacci and P. Schmuki,
"E-beam induced nano-masking for metal electrodeposition on semiconductor surfaces", *in 2nd International Symposium on Pits and Pores: Properties and Significance for Advanced Materials*, 198th Meeting of the Electrochem. Soc.,

Phoenix, October 2000.

P. Schmuki, L. Santinacci, T. Djenizian and D.J. Lockwood, "Formation and properties of porous InP", in *2nd International Symposium on Pits and Pores: Properties and Significance for Advanced Materials*, 198th Meeting of the Electrochem. Soc., Phoenix, October 2000.

D.J. Lockwood, L. Santinacci, T. Djenizian and P. Schmuki, "Optical properties of InP", in *2nd International Symposium on Pits and Pores: Properties and Significance for Advanced Materials*, 198th Meeting of the Electrochem. Soc., Phoenix, October 2000.

2001 P. Schmuki, L. Santinacci

AFM-induced nanopatterning of Si surfaces", German Research Foundation (DFG), "Workshop of the Electrochemical Nanotechnology Program", Pommersfelden, January 2001

L. Santinacci, T. Djenizian and P. Schmuki

"AFM Induced Nanoscale Electrochemical Deposition of Metals on Si (100) Surfaces", in *Electrochemical Deposition and Dissolution*, Joint International Meeting: 200th ECS meeting and the 52nd ISE meeting, San Francisco, September 2001.

L. Santinacci, T. Djenizian and P. Schmuki

"Selective Pd Electrochemical Deposition on Si (100) Surfaces Assisted by AFM", in *Interfacial Structure, Kinetics, and Electrocatalysis*, Joint International Meeting: 200th ECS meeting and the 52nd ISE meeting, San Francisco, September 2001.

L. Santinacci, T. Djenizian and P. Schmuki

"A Novel Semiconductor Nano-Patterning Approach Using AFM-Scratching Through Thin Oxide Layers ", *Semiconductor- and Photo-Electrochemistry*, Joint International Meeting: 200th ECS meeting and the 52nd ISE meeting, San Francisco, September 2001.

T. Djenizian, L. Santinacci and P. Schmuki

"Electron-Beam Induced Carbon Nano-masking for Selective Electrodeposition of Metals on Si(100)" in *Electrochemical Deposition and Dissolution*, Joint International Meeting: 200th ECS meeting and the 52nd ISE meeting, San Francisco, September 2001.

T. Djenizian, L. Santinacci and P. Schmuki

"Electron Beam Induced Carbon Masking for Selective Porous Silicon formation" in *6th International symposium on the physics and chemistry of luminescent materials* Joint International Meeting: 200th ECS and the 52nd ISE, San Francisco, September 2001.

T. Djenizian, L. Santinacci and P. Schmuki

"Electron-Beam Induced Carbon Patterns Used as Mask for the Cadmium Sulfide Deposition on Si(100)" Joint International Meeting: 200th ECS meeting and the 52nd ISE meeting, San Francisco, September 2001

Publications in proceeding volumes

- 2000 L. Santinacci, T. Djenizian and P. Schmuki, "AFM induced nano-patterning of Si surfaces", in *2nd International Symposium on Pits and Pores: Properties and Significance for Advanced Materials*, P. Schmuki, Editor, PV 2000-25, p. 189, The Electrochemical Society Proceedings Series, Pennington, NJ (2001).
- T. Djenizian, L. Santinacci and P. Schmuki, "E-beam induced nano-masking for metal electrodeposition on semiconductor surfaces", in *2nd International Symposium on Pits and Pores: Properties and Significance for Advanced Materials*, P. Schmuki, Editor, PV 2000-25, p. 200, The Electrochemical Society Proceedings Series, Pennington, NJ (2001).
- P. Schmuki, L. Santinacci, T. Djenizian and D.J. Lockwood, "Formation and properties of porous InP", in *2nd International Symposium on Pits and Pores: Properties and Significance for Advanced Materials*, P. Schmuki, Editor, PV 2000-25, p. 554, The Electrochemical Society Proceedings Series, Pennington, NJ (2001).
- D.J. Lockwood, L. Santinacci, T. Djenizian and P. Schmuki, "Optical properties of InP", in *2nd International Symposium on Pits and Pores: Properties and Significance for Advanced Materials*, P. Schmuki, Editor, PV 2000-25, p. 567, The Electrochemical Society Proceedings Series, Pennington, NJ (2001).
- 2001 T. Djenizian, L. Santinacci and P. Schmuki, "Electron beam induced carbon masking for selective porous silicon formation", in *6th International symposium on the physics and chemistry of luminescent materials*, M. Cahay, Editor, PV 2001, The Electrochemical Society Proceedings Series, Pennington, NJ (2001).

Publications in reviewed scientific journals

- 2000 P. Schmuki, L. Santinacci, T. Djenizian and D.J. Lockwood, "Pore formation on n-InP", *Phys. Stat. Sol. A*, **182**, 51 (2000).
- 2001 T. Djenizian, L. Santinacci, P. Schmuki: "Localized Electrochemical Deposition of Au into E-beam patterns" *J. Electrochem. Soc.*, **148**, 197(2001).
- T. Djenizian, L. Santinacci, P. Schmuki: "Electron beam-induced carbon masking for electrodeposition on semiconductor surfaces" *Appl. Phys. Lett.*, **78**, 2940 (2001).
- L. Santinacci, T. Djenizian and P. Schmuki, "AFM induced nano-patterning of Si surfaces", *J. Electrochem. Soc.*, **148**, 640 (2001).
- L. Santinacci, T. Djenizian and P. Schmuki, "Nanoscale patterning of Si(100) surfaces by scratching through the native oxide layer using atomic force microscope", *Appl. Phys Lett.*, **79**, 1882(2001).
- T. Djenizian, B. Petite, L. Santinacci and P. Schmuki, "Electron-beam induced carbon deposition used as mask for cadmium sulfide deposition", *Electrochim. Acta*, (2001), in press.
- T. Djenizian, G. I. Sproule, S. Meisa, D. Landheer, X. Wu, L. Santinacci, P. Schmuki and M. Graham, "Composition and growth of thin anodic oxides formed on InP (100)" *Electrochim. Acta*, submitted.
- L. Santinacci, T. Djenizian, S. Ecoffey, H. Mokdad, T. Campanella and P. Schmuki, "Selective Palladium electrochemical deposition on Si (100) assisted by AFM oxide scratching", *Electrochim. Acta*, submitted

T. Djenizian, L. Santinacci and P.Schmuki, "*E-beam induced carbon deposition used as negative resist for selective porous Si formation*", J. Electrochem. Soc., submitted

T. Djenizian, L. Santinacci and P.Schmuki, "*E-beam induced mask effect for electrochemical reaction, nanostructures fabrication*", Electrochim. Acta, submitted

Publications of more general nature

2001 Report form the on-line scientific journal: "Insight R&D alert" about sub-100-nm technology for device fabrication

T. Djenizian, L. Santinacci and P.Schmuki, "*Sub-100-nm mask is repairable* ", Frost & Sullivan, New-York, June 8th 2001

Languages: French (mother tongue). English and Italian (reading and writing) and basic knowledge of German.