

RESUME

Objective

To find a challenging working environment in an engineering / research department and to help solving problems through novel approaches and solutions. Utilizing my background to conceptualize and engineer cutting edge systems and processes required for engineering or research projects with an optional strategy towards scientific publications.

Education

1997

North Carolina State University, Raleigh, North Carolina, USA

Research Assistant as an exchange student in Prof. Schetzina's Laboratory Group

Molecular Beam Epitaxy of GaN and characterization (PL, I/V, SEM)

1998

Johannes Kepler Universität, Linz, Austria

Institute of Semiconductor and Solid State Physics - NanoScience and Technology

Center Linz - <http://www.nanoscience.at>

Vertical and lateral ordering in self-organized IV-VI quantum dot superlattices

Spiral growth of PbTe (111) in molecular beam epitaxy far from thermodynamic equilibrium.

Room- and high temperature UHV STM/AFM characterization of PbTe/PbEuTe multi-quantum wells – imaging dynamic surface processes at elevated temperatures by UHV STM, atomic resolution of surfaces

Diploma thesis: Scanning Tunneling Microscopy of Buried Self-Assembled Stranski-Krastanow Islands Fabricated by Strained-Layer Heteroepitaxy (Under the direction of ao.Univ.Prof. Dr. Gunther Springholz and o.Univ.Prof. Dr.Günther Bauer)

1998

North Carolina State University, Raleigh, North Carolina, USA

Research Assistant in Prof. Schetzina's Laboratory Group

Continued research on MBE growth and characterization of GaN (PL, I/V, SEM)

1999-2003

North Carolina State University, Raleigh, North Carolina, USA

Research Assistant in Prof. Nemanich's Laboratory Group

CVD growth and characterization (electron emission, morphology) of carbon based materials (doped and undoped diamond films, nanocrystalline diamond and carbon nanotube films)

2003

Master of Science in Physics at North Carolina State University

Thesis: Thermionic emission from doped and nanocrystalline diamond. (Under the direction of Prof. Dr. Robert J. Nemanich)

2003-

Research Physicist involved in the following projects

Small Business Innovation Research (SBIR) Phase II (funded by Air Force) - Thermionic Energy Conversion

Thermionic Energy Conversion - Multidisciplinary University Research Initiative (TEC MURI) (funded by the Office of Naval Research) – Thermionic Energy Conversion

Joint project on electron emission from nanostructured carbon films for high current density cathodes (with V. Nemanic - Jozef Stefan Institute, Slovenia)

Experience

Long experience with UHV deposition and characterization systems their configuration and laboratory implementation:

I was planning, designing and implementing of a ultra-high purity (UHP) process gas delivery and safety system. Here, I was working with facilities operations (NC State Univ.) and our contractor (INCO) to supervise the installation to our specifications.

Gas delivery

Centralized UHP process gas delivery to 16 UHV systems

Centralized gas delivery for pneumatic actuators

Safety

Design of a continuous air monitoring and alarm/gas shut off system for toxic and combustible gases

Design and construction of a high temperature (400°C) UHV scanning tunneling microscope (modified Park Scientific Instruments apparatus) and in vacuo tip annealer. My research was focused on describing dynamic surface processes and electronic properties of superlattices.

Design and construction of a UHV thermionic – field emission and energy conversion measurement system with cooled collector and I designed a ‘thermionic-cell’ for device – oriented measurements of a thermionic energy converter.

Design and construction of a plasma assisted chemical vapor deposition systems for diamond and diamond like carbon films.

Design and implementation of an induction heater for a chemical vapor deposition system films.

Extensive knowledge and experience of film growth by MBE and plasma assisted CVD as well as several materials characterization techniques:

Growth of semiconductor materials:

Molecular beam epitaxy - MBE (Riber and EPI)

MBE growth of PbTe/PbEuTe superlattices

Growth of doped and undoped GaN

Chemical vapor deposition – CVD (AsTex)

Growth of carbon based materials (Doped and undoped diamond, nanocrystalline diamond and carbon nanotubes)

Materials characterization:

- UHV and ambient atomic force microscopy
- Scanning electron microscopy
- Photo - electron emission microscopy (PEEM)
- Auger spectroscopy
- PL spectroscopy
- Raman Spectroscopy
- Field Emission
- Thermionic Electron Emission
- Thermionic Energy Conversion

In a team, I was preparing the materials physics and engineering part for award winning proposals for Small Business Innovation Research (SBIR) Phase I and II Projects on Thermionic Energy Conversion (Phase I & II) and high power semiconductor-insulator-semiconductor (SIS) switches (Phase I & II).

I was working under time constraints to meet project goals for the Multidisciplinary University Research Initiative (TEC MURI) project. Here, federal contract monitors requested significant materials improvements for a program extension. I succeeded by engineering a layered electron emitter structure and optimized the material resulting in electronic properties which exceeded the requested project target (e.g.: improved effective work function from 2 eV to < 1.5 eV).

Miscellaneous

- Design and construction of
 - Analog and digital control electronics
 - Electronic power supplies
- Design of vacuum hardware

Teaching - Software Development

Teaching of a physics lab (graduate level) at the University of Linz, Austria

Software development:

- Development and implementation of authenticated, interactive web content for database applications.
- Authenticated laboratory web database
- Authenticated, scientific journal management (web-database) application for editor and reviewer access.
- Implementation and setup of web servers.

I was developing an interactive web-database application for the review process of a scientific journal for authors, reviewers and the editor. This application includes upload of files on the server, control and management of files by employment of database tools. Automated messaging through email via CDONT's by sending email from web interfaces without the need of an email client. Online submission of reviews and comments by using textstream objects for platform independence. Download of self-extracting zipped archives for multiple files by server side zipping 'on the fly'.

Extracurricular Activities

Elected vice chairman of the physics student body at the University of Linz, Austria (1995-1996)

On several committees for the appeal of professors

Service implementation for students

Chairman of the Gallery at the University, Linz, Austria (1995)

Organization and arrangement of art exhibitions

Chairman of the a public project “Sozialprojekt” (1995)

Fund raising, exhibitions and awareness building.

Organizing and management, public discussion groups

Chairman of the student body to the cath. alumni association, Linz, Austria (1995-1996)

I had several oral presentations and one invited talk at international conferences (Electrochemical Society, Materials Research Society, European Conference on Diamond, Diamond-Like Materials, Carbon Nanotubes and Nitrides)

Selected Publications

Field penetration and its contribution to field enhanced thermionic electron emission from nanocrystalline diamond films

DIAMOND AND RELATED MATERIALS 15 (11-12): 2006-2009 Sp. Iss. SI NOV-DEC 2006

F.A.M. Koeck, R.J. Nemanich

Electron emission microscopy of nano-crystal graphitic films as high current density electron sources

DIAMOND AND RELATED MATERIALS 15 (4-8): 875-879 Sp. Iss. SI APR-AUG 2006

F.A.M. Koeck, A.N. Obraztsov, R.J. Nemanich

Photo and field electron emission microscopy from sulfur doped nanocrystalline diamond films

DIAMOND AND RELATED MATERIALS 15 (4-8): 880-883 Sp. Iss. SI APR-AUG 2006

F.A.M. Koeck, M. Zumer, V. Nemanic and R.J. Nemanich

Thermionic Converters Based on Nanostructured Carbon Materials

Franz A. M. Koeck, Yunyu Wang, and Robert J. Nemanich

Space Technology and Applications Forum – STAIF 2006

AIP Conference Proceedings, January 20, 2006, Volume 813, Issue 1, pp. 607-613

doi:10.1063/1.2169241

Sulfur doped nanocrystalline diamond films as field enhancement based thermionic emitters and their role in energy conversion

F.A.M. Koeck, R.J. Nemanich

DIAMOND AND RELATED MATERIALS 14 (11-12): 2051-2054 NOV-DEC 2005

Thermionic field emission from nanocrystalline diamond-coated silicon tip arrays

J.M. Garguilo, F.A.M. Koeck, R.J. Nemanich, X.C. Xiao, J.A. Carlisle, O. Auciello

PHYSICAL REVIEW B 72 (16): Art. No. 165404 OCT 2005

Field enhanced thermionic electron emission from sulfur doped nanocrystalline diamond films

F.A.M. Koeck, J.M. Garguilo, R.J. Nemanich

DIAMOND AND RELATED MATERIALS 14 (3-7): 704-708 Sp. Iss. SI MAR-JUL 2005

On the thermionic emission from nitrogen-doped diamond films with respect to energy conversion

F. A. M. Koeck, J. M. Garguilo and R. J. Nemanich

DIAMOND AND RELATED MATERIALS 13 (11-12): 2052-2055 NOV-DEC 2004

Spatial distribution of electron emission sites for sulfur doped and intrinsic nanocrystalline diamond films

F. A. M. Koeck, J. M. Garguilo, R. J. Nemanich, S. Gupta, B. R. Weiner and G. Morell

DIAMOND AND RELATED MATERIALS 12, 3-7, March-July 2003, Pages 474-480

Direct Correlation of Surface Morphology with Electron Emission Sites for Intrinsic Nanocrystalline Diamond Films

F. A. M. Koeck, J. M. Garguilo and R. J. Nemanich

DIAMOND AND RELATED MATERIALS 13, 4-8, April-August 2004, Pages 1022-1025

R&D of diamond films in the Frontier Carbon Technology Project and related topics

Koji Kobashi, Yoshiki Nishibayashi, Yoshihiro Yokota, Yutaka Ando, Takeshi Tachibana, Nobuyuki Kawakami, Kazushi Hayashi, Kenichi Inoue, Kiichi Meguro, Hiroshi Imai, Hiroshi Furuta, Takashi Hirao, Kenjiro Oura, Yasuhito, Gotoh, Hironori Nakahara, Hiroshi Tsuji, Junzo Ishikawa, Franz A. Koeck, Robert J. Nemanich, Tadashi Sakai, Naoshi

Sakuma and Hiroaki Yoshida

DIAMOND AND RELATED MATERIALS 12, 3-7, March-July 2003, Pages 233-240

Electron emission microscopy measurements of nitrogen and sulfur doped carbon films

F. Koeck, S. Gupta, B. R. Weiner, G. Morell, J. M. Garguilo, B. Brown and R. J. Nemanich,

201st Meeting - Philadelphia, Pennsylvania, May 12-17, 2002

Enhanced low-temperature thermionic field emission from surface-treated N-doped diamond films

F.A.M. Koeck, J.M. Garguilo, B. Brown, et al.

DIAMOND AND RELATED MATERIALS 11 (3-6): 774-779 Sp. Iss. SI MAR-JUN 2002

Fibrous structures on diamond and carbon surfaces formed by hydrogen plasma under DC bias

Koji Kobashi, Takeshi Tachibana, Yoshihiro Yokota, Nobuyuki Kawakami, Kazushi Hayashi, Kazuhiro Yamamoto, Yoshinori Koga, Shuzo Fujiwara, Yasuhito Gotoh, Hironori Nakahara, Junzo Ishikawa, Franz Koeck, Robert Nemanich

JMR-2002-0245.R1

Imaging electron emission from diamond film surfaces: N-doped diamond vs. nanostructured diamond

F.A.M. Köck, J.M. Garguilo, R.J. Nemanich

DIAMOND AND RELATED MATERIALS 10 (9-10): 1714-1718 SEP-OCT 2001

A critical comparison between MOVPE and MBE growth of III-V nitride semiconductor materials for optoelectronic device applications

M.A.L. Johnson, Z.H. Yu, J.D. Brown, F.A. Koeck, N.A. El-Masry, H.S. Kong, J.A. Edmond, J.W. Cook, J.F. Schetzina

MRS INTERNET J N S R 4: art. no. G5.10 Suppl. 1 1999