Cleanroom Vienna

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This report intends to review the main activities of the MISZ TU Wien (Mikrostrukturzentrum der Technischen Universität Wien) in the year 2000. In the cleanroom facility available technologies for the production of optoelectronic and microelectronic prototype devices include state of the art growth of III-V nanostructures, standard contact lithography, the production of patterned masks to be used in standard lithography, various structuring techniques like dry etching and plasma enhanced chemical vapor deposition, electron beam writing, focused ion beam etching and depositing, and. different metallization techniques. State of the art silicon processing started 1998 and will need further activities to mature. A variety of device characterization techniques like transport measurements, spectroscopic techniques for optoelectronic devices and surface probing like scanning tunneling microscopy are available. An atomic force microscopy system with the possibility to probe capacitance locally was brought into the cleanroom in the year 2000. In this report, a short description of research projects with a high need of technological input, using the equipment in the cleanroom and the cleanroom environment is given.

The following reports represent the main research efforts of the solid state electronics institute (Festkörperelektronik TU Wien) within the last twelve months. All the projects described below like transport studies in low dimensional semiconductor nanostructures, scanning probe spectroscopy, realization of new and improved optoelectronic devices, quantum cascade lasers, THz sources, and the characterization of microelectronic devices, take full advantage of the technologies installed in the cleanroom of the MISZ (Reinraum Mikrostrukturzentrum der TU Wien).

To satisfy this variety of topics, state of the art growth of semiconductor nanostructures (molecular beam epitaxy) is needed as well as a complete process line including structure definition (lithography), structure transfer (reactive ion etching, focussed ion beam etching, ion milling, wet chemical etching techniques) and coating with metals and/or dielectrics (plasma-enhanced chemical vapor deposition, sputtering, electron gun evaporation, focussed ion beam deposition). All the equipment necessary for the above mentioned technologies needs the cleanroom environment (cooling, filtered air, constant temperature and humidity, high quality water, different inert gases) as well as periodic maintenance of the equipment and the cleanroom itself, e.g. pumping systems (rotary pumps, turbo pumps), exhaust filtering, liquid nitrogen, and cleaning and repair. Testing of the cleanroom quality and adjustment (laminar airflow, filters, cooling, humidity, and temperature) is done periodically.

In addition to the above mentioned technologies further equipment was installed in the cleanroom in 2000. The installations include an extended compressed air system, new or totally refurbished rotary pumps for the plasma enhanced CVD and the reactive ion etching system, exchanged turbo pumping systems for the metallization units, and an extension of the liquid nitrogen supply.

From the scientific point of view a new technique to explore surface morphology as well as local carrier concentrations was installed. This is done with a conventional Atomic Force Microscope (AFM) in combination with a Scanning Capacitance Microscopy (SCM) extension. A detailed description of this new equipment as well as the additional technological possibilities is given in the following.

The main research activities making use of the cleanroom itself or using samples grown, structured and tested in the MISZ are described. These activities are not the only projects running in the MISZ, but are intended to show a representative overview of the basic research as well as applied projects which need the cleanroom infrastructure. For a more general overview the listed projects and the attached publication list may give more insides on the broad range of activities in our facility.

Project Information

Project Manager

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Project Group

Last Name	First Name	Status	Remarks
Basnar	Bernhard	postdoc	
Bertagnolli	Emmerich	o. prof.	
Boxleitner	Winfried	postdoc	
Bratschitsch	Rudolf	dissertation	
Coquelin	Michael	student	
Dzigal	Elvira	technician	
Fasching	Gernot	student	
Fehlmann	Gerhard	student	
Finger	Norman	dissertation	
Fischler	Wolfgang	dissertation	
Fürböck	Christoph	dissertation	
Gianordoli	Stefan	dissertation	
Golka	Sebastian	student	
Gornik	Erich	o. prof.	
Harasek	Stefan	dissertation	
Heer	Rudolf	dissertation	
Hirner	Heimo	student	
Hobler	Gerhard	ao. prof.	
Hofer	Stefan	dissertation	
Hvozdara	Lubos	dissertation	
Kamvar	Parvis	student	
Kast	Michael	dissertation	
Kellermann	Peer	dissertation	
Kröll	Peter	technician	
Langfischer	Helmut	dissertation	GMe
Litzenberger	Martin	dissertation	
Lugstein	Alois	univ. ass.	

Last Name	First Name	Status	Remarks
Maier	Harald	student	
Maier	Thomas	dissertation	GMe
Müller	Thomas	dissertation	
Pacher	Christoph	dissertation	
Patz	Sybille	student	
Ploner	Guido	postdoc	
Pogany	Dionyz	univ. ass.	
Prinzinger	Johannes	technician	
Rakoczy	Doris	dissertation	
Riegler	Erich	technician	
Schinnerl	Markus	technician	
Schenold	Helmut	technician	
Schrenk	Werner	dissertation	
Smoliner	Jürgen	ao. prof.	
Strasser	Gottfried	univ. ass.	
Ulrich	Jochen	dissertation	
Unterrainer	Karl	ao. prof.	
Wanzenböck	Heinz	univ. ass.	
Zobl	Reinhard	dissertation	

Books and Contributions to Books

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Cooperations

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