References

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PLD Workstation:

MPI für Mikrostrukturphysik, Halle
1995 1st system 3“ PLD with Load Lock , RHEED, microwave plasma source, spectral ellipsometer **)
1998 2nd system PLD system, 1” workstation with additional sputter source
2009 3rd system PLD Workstation 1” with Laser heater and UHV transfer case
**) 2009 sold to and installed at Nanovation, France

American University of Beirut (see reference letter)
2000 2” PLD Workstation
2004 Microwave source upgrade
2005 Microwave CVD chamber

University of LEEDS
Prof. Andrew Bell,
2003 PLD Workstation, 2” with process automation

ETH Zürich:
Prof. Gauckler, Prof. Jeniffer Rupp
2004 PLD Workstation, 2” with process automation
2016 2nd PLD Workstation module, connected with the first system, sharing the laser

Trinity College Dublin:
Prof. James Lunney
2004: PLD Workstation, 1” PLD Workstation vacuum set up complete, special frame
2005: High pressure RHEED system

RWTH Aachen
Prof. Martin
2005 PLD Workstation 2”
2007 Microwave plasma source upgrade
2010 Customised ion sputter system for tracer experiments, based on the workstation hardware
2012 2nd PLD Workstation chamber connected with the first system, sharing the laser

University of Barcelona
Dr. José Santiso
2007 Complete PLD lab with three PLD workstation, one with HP-RHEED, one with additional Sputter source, one MAPLE system
2008 Upgrade MAPLE chamber upgrade with additional (2nd) laser system
2009 Upgrade MAPLE chamber with additional multi target holder and 1” heater
2017 Upgrade MAPLE chamber to a combinatorical research system by adding TwinBeam option: dual beam laser deposition from two targets for insitu material deposition and mixing at the substrate

CSIC, Madrid
Instituto de Optica,
Prof. Carmen N. Afonso
2010 PLD Workstation 1“

Technion, Haifa
Dr. Avner Rothschild
2007 PLD Workstation, 2”

University of Cyprus
Dr. Ioannis Gianpitzakis
2007 PLD Workstation 1” with HP RHEED

References

University of Bucharest
Dr. Pintilié
2008 PLD Workstation 1” with HP- RHEED and additional sputter source
2012 2nd PLD Workstation BUDGET system connected with the first system, sharing the laser
2015 PLD MAPLE workstation with mixed maple and oxide target system and load lock
2017 Software upgrade for Budget system

University of Leipzig
Dr. Ziese
2009 PLD Workstation with advanced SURFACE laser heater and UHV transport case for sample transfer under UHV condition over several weeks.

University of Kiel
Prof. Quandt
2009 PLD Workstation 1” with SURFACE HP RHEED and sample transfer system to existing UHV transport case and fluency control

Research Centre of Rossendorf
Frau Prof. Schmidt
2009 PLD Workstation 1” with SURFACE HP RHEED, fluency control and MW Ion source

University of Oslo
Prof. Truls Norby
2009 PLD Workstation 2”
2015 fast cycle and advanced pressure control upgrade

University of Giesen,
Institute of physical chemistry of solids
Prof. Janek
2010 PLD Workstation 1” with glove box-load lock connection, exchange of substrates and targets under well defined conditions from the glove box into the PLD chamber.
2011 YAG laser upgrade at the same workstation, SURFACE laser heater, fluence control
2013 Glovebox with integrated sputter system with 4” magnetron and 3” substrate heater
2015 Combi system PLD+IBS workstation with integrated glove box

Institute für Kristallzüchtung, Berlin
Dr. Schwarzkopf
2011 PLD Workstation 1” with SURFACE HP RHEED and fluence control
2012 Load lock chamber upgrade

University of Halle
Prof. Dörr
2013 dual PLD Workstation 1” 1st system with SURFACE high pressure RHEED, 2nd system with on/off axis option
2016 Load Lock chamber upgrade for one chamber with docking port for UHV transport case

University of Freiburg
IMTEK, Dr. Breunig
2013 PLD Workstation 1” with SURFACE high pressure RHEED, controlled deposition of small 3D substrates under RHEED observation
2015 Fluence control upgrade

Karlsruhe Center of Technology KIT
Institute for Nanotechnology
Prof. Hahn
2013 UHV PLD Workstation with laser heater, SURFACE high pressure RHEED, transfer tunnel system to

connect the system to an existing UHV MBE cluster,

Franfofer Institut THM Freiberg
Dr. Wunderwald
2013 PLD Workstation with load lock, SURFACE high pressure RHEED, MW Ion source, Fluence control

University of Halle
Zentrum für Innovationskompetenz
Dr. Akash Bhatnagar
2017 PLD Workstation 1“ with SURFACE high pressure RHEED

UHV cluster tool systems / Laser MBE systems:

MPI für Mikrostrukturphysik, Halle
1995 3“ UHV PLD with Load lock , RHEED, microwave plasma source, spectral ellipsometer

Walter Meissner Institute, Prof. Gross
1996 Laser Star Laser MBE cluster tool system
1997 UHV STM/AFM upgrade
2002 Laser heater upgrade
2003 2” Sputter module with transfer module 2004
2008 2nd laser heater, new generation

University of Darmstadt, Prof. Jägermann
1998 Multi purpose cluster tool system with vacuum connection to an existing ESCA system (PHI)
Including LEED chamber, evaporation chamber, cleaving chamber

Technion, Haifa (see reference letter)
Dr. Wayne Kaplan
1998 UHV Wetting system

Cornell University, Prof. Shefford Baker (see reference letter)
2000 UHV cluster star for 4” wafer, metal sputter chamber, with in situ stress measurement
annealing chamber, with in situ stress measurement

EPFL Lausanne, Prof. Muralt
2001 Laser Star Laser MBE with additional ESCA, UHV STM/AFM, 2nd process chamber 2002
2008 2nd PLD chamber with laser heater and PLUME MASTER control system upgrade

RISOE, Roskilde, Danmark; Prof. Joergen Schou,
2003 5” PLD system, UHV star module with load lock. With process automation.
2015 Win7 upgrade

University of Fribourg, Prof. Bernhard
2007 Laser MBE system with load lock, HP-RHEED and laser heater
2008 Cluster tool upgrade with transfer chamber and two evaporation chambers for anorganic
and organic materials, UHV sample mask exchange chamber, UHV transport case module

References

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Research Centre Jülich

(Peter Grünberg Institut, Nobel prize in 2007 : Prof. Gruenberg)

Prof. Waser

2009 Laser MBE cluster tool system with PLD module incl. SURFACE advanced Laser heater and HP RHEED and UHV transport case module
2009 Sputter module extension with connection tunnel and separate load lock
2010 SPM Module including Omicron VT, with sample annealing chamber and separate load lock
2010 Tunnel substrate transfer system to connect directly other UHV systems with the Laser MBE cluster
2011 1st Tunnel extension system to adapt other UHV system to the cluster
2011 2nd Tunnel extension system to adapt other UHV system to the cluster

CNRS Paris

(department of physic Nobel prize 2007 : Prof. Fert)

Dr. Manuel Bibes

2009 Laser MBE system with PLD module incl. SURFACE advanced Laser heater and HP RHEED
2010 Cluster tool extension
2011 Eximer laser with beam line
2012 front side pyrometer and fluence control
2014 2nd LaserMBE module with Laserheater and HP RHEED and beam line connection*)
2015 Disassembling manipulator upgrade for the load lock chamber to connect an UHV transport system

Ioffe Institute St.Petersburg

Prof. Sokolov

2013 Laser MBE system with PLD module incl. SURFACE HP RHEED and transfer tunnel system to an existing MBE chamber, integration of the customer's substrate size

In-situ beam line system

Karlsuhe Institute of Technology
ANKA Synchrotron

Nano beam line

Dr. Sondes Bauer

2012 In-situ PLD system with SUTRFACE HP RHEED, Laser heater, Hexapode substrate manipulator, load lock chamber, YAG Laser. UHV-transport chamber.
The system is mounted in a large six axis high resolution HUBER Goniometer
The system can be removed or delivered to this Goniometer in less 30 min and is fully functional on top of the controller cabinet, which includes the transfer

References

SURFACE Laser Heater users

UHV cluster tool systems / Laser MBE systems:

Malter Meissner Institute, Prof. Gross

2002 Laser heater upgrade
2005 2nd laser heater , new generation

EPFL Lausanne, Prof. Muralt
2008 2nd PLD chamber with laser heater upgrade

University of Fribourg, Prof. Bernhard
2007 Laser MBE system with load lock, HP-RHEED and laser heater

Research Centre Jülich, Prof. Waser (Physics Nobel prize 2007 : Prof. Gruenberg)
2009 Laser MBE cluster tool system with PLD module incl. SURFACE advanced Laser heater and HP RHEED and UHV transport case module

CNRS Paris, Dr. Manuel Bibes (Physic Nobel prize 2007 : Prof. Fert)
2009 Laser MBE system with PLD module incl. SURFACE advanced Laser heater and HP RHEED
2014 2nd PLD module incl. SURFACE advanced Laser heater and HP RHEED *)

PLD Workstation systems:

University of Leipzig
Dr. Ziese
2009 PLD Workstation with advanced SURFACE laser heater and UHV transport case for sample transfer under UHV condition over several weeks.

University of Giesen,
Prof. Janek
2011 YAG laser upgrade at the same workstation, SURFACE laser heater, fluence control

Research Center Karlsruhe

2012 ANKA-Synchrotron: insitu beam line PLD sytem with in vacuum hexapode controlled sample position with integrated laser heater

2014 Center for Nanotechnology
PLD UHV Workstation with transfer tunnel, laser heater, high pressure RHEED

References

Laser heater user, sold as component:

Research Center Karlsruhe
2005 Dr. Fuchs used at the ANKA light source: PLD+ ESCA system
2009 Dr. Thorsten Schwarz ANKA: large goniometer setup

Createc:
2008 Mr. Fischer Laser heater for a large MBE system

MPI Stuttgart
2009 Mittermejer group, sample annealing: cleaning from Carbon contamination before **Si MBE**
2009 Habermeier group, PLD heater

ORNL, Oakridge
Materials Science and Technology Division and Center for Nanophase Materials Sciences
2011 Dr. Hans Christen

TU Wien, A
2012 Prof. Jannik Meyer Laser heater for optical microscopy work

University Augsburg, D
2014 Prof. Hammerl

Sumitomo Nippon Steel
2014 SURFACE advanced laser heater for SEM Zeiss Auriga*)

University of Tel Aviv, Israel
2016 Prof. Yoram Dagan

CAS Beijing, Institute of Physics, China
2016 Prof. Yujie Sun*)

CO2 Laser heater

University of Leipzig
2012 Dr. Lorenz upgrade of an in house PLD

*) inproduction

References

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Wolfgang Stein
SURFACE
Rheinstr.7
D-41836 Hueckelhoven
GERMANY

October 22, 2004

Dear Wolfgang,

This letter is to thank you and SURFACE for the excellent work that you did in designing, building, and supporting the UHV system that you delivered to us in Summer of 2000. This letter may be used as a reference. People interested in learning about our experience with SURFACE and with this machine may contact me at the coordinates above.

Our system comprises a transfer chamber, a deposition chamber, and a thermal stress measurement chamber, all tied together and accessed via a central transfer chamber with manipulator. This system incorporates several innovations. One is a sample heater stage in the stress measurement chamber that must very uniformly heat samples to temperatures above 900°C while still allowing full optical access to one side of the sample. The samples are 4" Si wafers and the heating and cooling must be accomplished without the possibility that thermal expansion will tilt the sample significantly in any direction. The heater stage that SURFACE designed and built has performed flawlessly. Another innovation is that the samples in our system cannot be attached to mounting plates as they are in other systems. That is, bare wafers must be manipulated throughout the system. This meant that specialized fixtures had to be designed for all of the sample stages, storage cassettes, and the transfer arm. In addition, in order that we could deposit films on both sides of a substrate, SURFACE designed and built a device that can be used to turn samples over in the UHV environment. This new system for handling bare wafers has worked extremely well. In most other respects our system is a "standard" UHV deposition system, which means that it is not standard at all. All of our requirements were met and the machine was delivered on time and for a very good price.

While very little has gone wrong with the system in the four years that we have had it, we have always found SURFACE to be very responsive when we have questions or problems to raise with them. The difficulties that we have has have either been self-induced, or have been typical UHV-related issues. This machine has functioned very reliably.

I can highly recommend SURFACE for both their competence and creativity in designing engineering solutions to our unique problems, and in their dedication to ensuring that our system functioned well, not only at the time of commissioning, but in the intervening years.

With best regards,

Shefford P. Baker

References

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PHYSICS DEPARTMENT
دائـرة الفيزيـــاء
FACULTY OF ARTS AND SCIENCES
كليـــة الآداب والعلـــوم

AUB American University of Beirut
الجامعة الأميركية في بيروت

October 22, 2004

To Whom It May Concern:

The purpose of this letter is to share with you our experience with the SURFACE PLD Workstation system as well as to give our appreciation regarding SURFACE's customer support service.

To our knowledge, we were the first users of the PLD Workstation, as we purchased the system in April 2002 and I must say that we are extremely satisfied with its performance and minimal maintenance needs. For more than two years, the system has been heavily used in the growth of oxide and SiC thin films and has proved to be very rugged and user-friendly, as it has been operated by somewhat inexperienced students and technical staff who had little previous knowledge of the matter. The down-time that we experienced at some stages during these two projects was mainly due to problems with the laser. I must point out that it took less than a couple of hours to have the system up and running, after its delivery to our laboratory. Despite its relative simplicity, the design of the system is flexible enough to allow for the performance of experiments such as optical emission spectroscopy, as our system has two quartz windows placed perpendicular to each other for plume imaging and spectroscopy. Recently, we attached to the system a Remote Micro-Wave Plasma Source in order to perform plasma assisted pulsed laser deposition experiment. Adapting the MW source to the Workstation vacuum chamber was a task that was achieved with ease.

Regarding the support that we got from the company SURFACE, it is simply second to none. From the day our bid was placed, SURFACE appeared way above the rest in terms of the attention it gives to the needs of the customer. The communication with them is very easy and straightforward and their availability for advice and help on the operation of the system proved to be very important during the initial stages of the projects. They were also of much help when we faced problems that had little to do with their design, i.e. the problems we had with our laser as well as delays in the delivery of the excimer laser gas cylinders. In addition, they were willing to make modifications to the design of the system at a very late stage. The continuous support that we are getting from SURFACE has been essential for us especially that we are in country where very few scientific research companies have local representatives, and in which we are the only research laboratory that houses sophisticated vacuum systems. We are so happy with the SURFACE customer service that we have decided to purchase from them a MW downstream remote plasma reactor complete with pumping unit, process chamber and substrate holder.

Prof. Malek Tabbal
Associate Professor and Chairperson
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Beirut, Lebanon.

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TECHNION - ISRAEL INSTITUTE OF TECHNOLOGY

הפקולטה להנדסת חומרים
DEPARTMENT OF
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Mr. Wolfgang Stein
Surface
Rheinstr. 7
D-41836 Hückelhoven
Germany

27.10.96

Dear Mr. Stein,

This letteris to thank you for your excellentwork in the design and construction of my UHV Wetting Furnace.

I was very impressed with your expertise in the design of complicated UHV systems. You managed to turn my very rigid goals for UHV experiments at 1800°C into a real, working system. As you know, I needed to conduct experiments where I optically photograph the shape of liquid drops of metal on solid substrates, under UHV or protective gases, at temperatures up to 1800°C. In addition, I needed to control both the mixing of input gases and to clean the metals by sputtering before the wetting experiments.

The design and system you have built beautifully fulfill all of these goals. The system is dependable and easy to operate, and my group is now starting to produce very good and interesting data.

Again I want to thank you for all your help and expertise.

Yours Sincerely,

Wayne D. Kaplan

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