advanced customized characterization technology

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April 2006

Welcome

to the second aixACCT Systems newsletter, your partner for electrical testing, material development and device qualification.

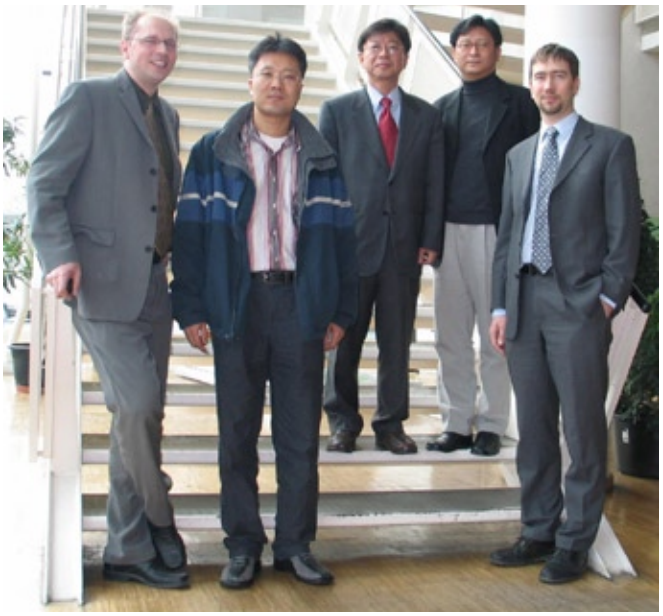
I hope you have had a good start to 2006, we anticipate a promising year with further growth and the introduction of a number of exciting new products in the middle of this year.

Nanotechnology is a rapidly expanding field in science and industry. Nanotechnology centres are popping up all around the world, and the market is developing rapidly. aixACCT Systems is right in the thick of it and we are gaining greater significance through our customized application of test system solutions and our successful partnerships.

Happy reading!

Yours sincerely,
Stephan Tiedke

INOSTEK Inc. and aixACCT Systems sign contract



INOSTEK Inc. will act as the new aixACCT representative in South Korea. The Korean technology provider is the world's leading provider of thin film technology. INOSTEK CEO Joowong Ha, CTO Seung-Hyun Kim, and Stephan Tiedke recently signed the contract in Aachen. aixACCT had invited the new partner for a three day training course on aixACCT products.

With the new cooperation aixACCT expects to vitally enhance its customer and advisory service, not only for better support of customers' projects, but also to provide quicker and more expert support and answers to its customers important operation questions.

INOSTEK is the successor to the former aixACCT distributor, ITI International. ITI supported aixACCT's successful start in the South Korean market and helped to establish an engaged and trusting relationship with customers.

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TF Analyzer convinced University of Twente

„The modular concept of the TF Analyzer series from aixACCT Systems has pretty much convinced us.“ declared Guus Rijnders, associated professor of MESA+ Institute of Nanotechnology, University of Twente, Netherlands. „The modular TF Analyzer offers the flexibility and resolution that we were looking for. The unique resolution, combined with high flexibility made the decision for this system after detailed evaluation.“

„During a live demonstration at the aixACCT facility we tested ultra thin ferroelectric films in a probing station, eliminating the leakage current influence and tested sub-micron capacitors in conjunction with an Atomic Force Microscope. Finally, we could check the piezoelectric properties on different thin films using single and double beam laser interferometers.“

The MESA+ Institute of Nanotechnology, University of Twente is highly experienced in film deposition by Pulsed Laser Deposition (PLD). It can deposit single atomic layers of different materials by using Atomic Layer Deposition, to build up artificial material clusters with advanced or even new properties.

The comprehensive characterization of these tailored films, morphological as well as electrical is very important. For this reason MESA+ was looking for an almost universal, and at the same time, very specific measurement set up to satisfy the requirements in the field of electrical testing.

Highest revenue in aixACCT history

aixACCT finished the 2005 with the highest revenue in its history. Multi-layer actuators and thin film applications strongly contributed to this success.

There is a clear trend toward commercialisation of MEMS (Micro Electro Mechanical System) devices as well as CMA (Ceramics Multi-layer Actuators) based on PZT (Lead Zirconate Titanate) for various applications.

Our products have moved from purely material characterization, through prototype lines, right up to quality assurance during production. But, we‘ve never lost touch with the field of scientific applications, where our products operate close to theoretical limits in resolution and speed.

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First 6 inch wafer Double Beam Laser Interferometer available

As innovation leaders for electrical thin film testing, aixACCT Systems has extended the approved double beam technique to the first commercially available Double Beam Laser Interferometer (DBLI) system for 6 inch wafer characterization.

This semi-automatic system is used for piezoelectric and electrical reliability testing of MEMS (Micro Electro Mechanical Systems) devices on 6 inch wafers. The excellent resolution of this system with a repeatable accuracy of greater than 2% qualifies this system for reliable mass production.

The aixDBLI system offers measurements of thin film thickness changes under electrical excitation with a proven accuracy (x-cut quartz) of 0.2 pm/V. The main feature of the system is the ultra fast acquisition time of seconds for a single measurement compared to other systems. In fact the measurement speed has been enhanced by a factor of 100, due to the employment of a new data acquisition algorithm. This has now enabled the comparison of electrical and mechanical data for thin films to be recorded at the same excitation frequency. The influence of sample bending has now been eliminated thanks to a differential measurement principle, which is the major obstacle when using atomic force microscopes (AFM) for these types of measurements.

ACCT is our motto - what does it mean?

aixACCT (Advanced Customized Characterization Technologies) have developed unique testing systems to meet the requirements of customers from different fields of science and technology.

We have all the necessary competence in-house: software development, circuit design, material knowledge and simulation techniques. This allows us to offer real system solutions with respect to the requirements of each customer.

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European team play for characterization of piezoelectric thin films

Integration of piezoelectric thin films in Micro Electro Mechanical Systems (MEMS) is the objective of the MEMS-pie project, founded by the European Commission. aixACCT Systems and EPFL – „Laboratoire de Céramique“ in Switzerland have built up a team to contribute to the Polecer International Conference in Hafjell, situated near Lillehammer, in Norway. The conference was held on March 6 – 8, 2006.

The contribution concerns piezoelectric PZT thin films, which are made of lead zirconate titanate (PZT) ($Pb(Zr_xTi_{1-x})O_3$). This material is widely used in MEMS devices.

Appropriate electrical and mechanical metrology is necessary for the characterization of these films and is essential for process specification and the design and qualification of the devices. Common electrical characterization methods are capacitance, loss tangent, and polarization hysteresis measurements. The effective longitudinal piezoelectric coefficient $d_{33,f}$ of thin films is precisely measured by double beam laser interferometry.

In addition aixACCT and EPFL present a new measurement method to estimate the just as important effective transverse piezocoefficient $e_{31,f}$, utilizing a 4-point bending setup adapted to thin film samples.

This setup allows the application of homogeneous, well defined mechanical stresses to the thin film. Stress and corresponding strain distributions in the film were verified by Finite Element simulations. Measurements are shown to demonstrate the capability and repeatability of the setup on PZT thin film samples.

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Staff increased

Our staff numbers have grown to more than 10 people to satisfy both application and R&D demands with the competing requirements of cost considerations and creativity for new solutions for the reaching of new goals.

Welcome to aixACCT Systems

Florian Weinthal came to aixACCT in January 2006. He is a specialist in system assembly and circuit design. The Piezoelectric Evaluation Systems and Double Beam Laser Interferometers are assembled by Florian. He assists the R&D division with circuit layout, assembly and testing.

Benjamin Benitsch joined aixACCT as a student worker in 2004 and started with system assembly and testing. During the last two years he has learned everything there is to know about the TF ANALYZER product series. In January 2006 he became a full-time employee with aixACCT after finishing his EE degree with honours. He is responsible for developing new products as extensions of the TF ANALYZER series.

aixACCT Calendar of Events

April 23 – 27, 2006
ISIF 2006, International Symposium on Integrated Ferroelectrics, Honolulu, Hawaii
http://www.isif.net

May 24 – 27, 2006
23rd Meeting on Ferroelectric Materials and Their Applications, Kyoto, Japan
http://fma.naist.jp

June 14 – 16 2006:
ACTUATOR 2006 - 10th International Conference on New Actuators and 4th International Exhibition on Smart Actuators and Drive Systems, Convention Center Bremen, Germany
http://www.actuator.de

June, 18 – 22, 2006:
Electroceramics X, International Conference on Electroceramics, Toledo, Spain
http://www.estyloweb.com/electroceramics-X/