Wednesday Lunch, October 31, 2012

Exhibitor Technology Spotlight
Room: West Hall - Session EW-WeL

Exhibitor Technology Spotlight
Moderator: D. Surman, Kratos Analytical Inc.

12:00pm **EW-WeL1 Nanoparticle Coating Technology for Vacuum Deposition**, *A.H. Kean, S. Saranu,* ***M. Green****, L. Allers*, Mantis Deposition Ltd., UK

In-vacuum generation and deposition of nanoparticles can provide enhancement to traditional thin film deposition techniques. Traditional thin film deposition in vacuum utilizes an evaporation, or sputter process that forms a two dimensional thin film. The Mantis Deposition Nanogen provides three dimensional nanoparticle crystals that are formed via a high pressure sputtering process. Through the process, the nanoparticles are thermalized, charged, and deposited on the substrate via a controlled beam. The resulting coating is a not a traditional thin film, but a three dimensional material consisting of deposited nanoparticles. Significant differences in the properties of these materials arise including greatly increased surface area and increased chemical reactivity. Because the nanoparticles are charged they can be measured and their kinetic energy may be controlled. This talk describes the technique as well as resulting material properties. Specific examples will be described as well as new nanoparticle structures such as core/shell materials enabled by this advanced technique.

12:20pm **EW-WeL2 Using the Ipad in PVD Applications**, ***C. Malocsay***, Semicore

It has taken 30 years for computer control to become a main stay in the operational architecture of Thin Film deposition systems. Now with that hurdle gone, using some of today's new tablet devices in conjunction with the system PC can provide a complete array of documents, schematics, video including direct communication with the factory engineer. Insuring day to day process performance remains consistent and cost effective; the Apple iPad is just another example of Semicore leading the way.

12:40pm **EW-WeL3 Physics-based Simulation for Semiconductor Processing Optimization**, *K. Jain,* ***N. Solanki***, ESI Group

ESI Group is a global supplier of end-to-end virtual prototyping software and solutions, incorporating the physics of materials for manufacturing industries. The presentation will focus on computation fluid dynamics (CFD) modeling in the semiconductor fabrication process. Semiconductor fabrication processes involve a complex interplay of physical and chemical phenomena at multiple time and length scales. The complexity of these processes is increasing with decreasing feature size. Understanding these processes is critical for achieving desirable feature characteristics. ACE Suite, from ESI Group, is a commercial CFD software that provides integrated simulation tools for analyzing a wide variety of semiconductor reactors, ranging from CVD to Electroplating reactors. The ACE Suite also includes a topological solver, CFD-TOPO, that allows designers to accurately predict the 3D shape evolution of the feature at micron level. Our presentation will include the key features and benefits of our software along with a few selected validation studies.

1:00pm **EW-WeL4 Passive Thermal Actuator**, ***I. Miller***, MEWASA North America, Inc.

General Description: The PTA™ (Passive Thermal Actuator) developed and manufactured by MEWASA A Swiss Manufacturing Company) is a self-operating device that changes its length according to temperature fluctuations and serves as a linear actuator in various applications. The metal Passive Thermal Actuator is designed for various specified temperature ranges and allows the user to design Mechanical, Cryogenic and Electro-optical systems with precise movement as required. The PTA™ unique sturdy construction design provides a maintenance free linear movement with an extremely high reliability. The PTA™ is designed for more than 1 million operational cycles. Principle Operation: The PTA™ is a stainless steel sealed welded metal construction is based on the precision Edge Welded Bellows that are designed and Manufactured by MEWASA. The sealed actuator is filled with thermal fluid which expands and retracts according to the fluid/environment temperature changes. Thus, generating precise repeatable linear movement; pushing and pulling the required mechanism under a specified load. The Expansion Rate (defined as the fractional change in length per degree change in temperature) is customized and tested at MEWASA's in-house laboratory per our rigid Q.A. standards prior to shipment. The PTA™ is designed to move within several microns (thousands of an inch) and will work in any temperature range between –40°c and +80ºc (-40°F to 176°F). This cost effective PTA™ is a leak tight actuator which maintains its repeatability in a wide range of temperatures and pressures. The PTA™ frictionless structure and compact design functions as the ultimate solution for systems where external power is undeliverable. The Passive Thermal Actuator designed and manufactured by MEWASA is capable to meet your parameters. Product Features: • Highly accurate linear movement in a wide range of temperatures and pressures. • Eliminates the need for external power. • Maintenance free operation – no elastomeric seals required. • Flexible design that can be installed in either horizontal or vertical orientation. • Hermetically sealed and environmentally protected. • Complete stainless steel construction to resist corrosion. • Frictionless operation. • Designed to customer specific functional needs • No calibration required – preset at factory (plug and play). • Designed to deliver extremely precise and highly repeatable linear activation. • Sizes: from Ø13mm (Ø ½") • Materials: St.St. 316, AM350, Titanium Gr. 2, Inconel, Hastelloy C-276. (Note: material selection should take into account the environment and application) • Available Lengths: From 12mm (½") according to design • End Piece Standards: Threads, flanges to fit customer design • Installation Position: Vertical or Horizontal • Thermal Expansion Coefficient: from 0.01mm/°C (0.0008"/°F) • Actuation Force: from 1kg (2.2 lb.)

1:20pm **EW-WeL5 Bipolar Technoloogy for AZO Sputtering**, *P. Ozimek,* ***W. Głazek****, K. Ruda, A. Klimczak, A. Gierałtowski*, HUETTINGER Electronic Sp. z o.o., Poland

Bipolar technology is currently being implemented in progressing number of applications like sputtering and PECVD. Thanks to state of the art digital control platform, TruPlasma Bipolar NEW power supply has an ability to react to dynamically changing parameters of the process very fast in order to enhance process efficiency and repeatability. The new opportunities offered by such control electronics enables new features supporting reactive sputtering with Bipolar technology. Presented solutions enable to deposit coatings with enhanced quality and at high deposition rate. Moreover TruPlasma Bipolar series 4000 NEW in response to growing market demand is equipped with latest industrial communication protocols like EtherCat or internet IP. TruPlasma Bipolar NEW is a solution for PECVD and a wide range of sputtering applications. TruPlasma Bipolar can be used with materials like: AZO, Si, SiN, Zn also smooth operation with capacitive and inductive loads under both: symmetrical as well as non symmetrical load conditions.

1:40pm **EW-WeL6 Novel Dual Mode Air Photoemission and Kelvin Probe System for Work Function Analysis of Nanometer Films**, ***I.D. Baikie***, KP Technology, UK

KP Technology have developed a novel surface characterization instrument – the Air Photoemission System (APS) – which yields information on both the absolute work function and the Density Of States (DOS) near the Fermi level of metals and semiconductors deposited as bulk, thin films, layers, devices etc. The new system uses low photon excitation energies (3.5 – 7.0eV)

and has been used to characterize thin films such as Cobalt-Phylocyanine (CoPc) on Transparent Conducting Oxides (TCOs) used in electroluminescent displays. We have combined this technique with our ultra-high relative work function resolution (1 – 3meV) macroscopic scanning Kelvin Probe Systems and can build up 2D work function maps of surfaces with lateral resolution of 100 – 2000mm.

The work function is an extremely surface-sensitive property of a material, modified by thin or monomolecular adsorbed layers, surface charging and for semiconductors, illumination. Indeed, work function changes of 500 - 1000meV magnitude can be observed with nanometer thick films deposited on glass, TCOs, metals and semiconductors. Our Kelvin Probe systems are also extremely versatile, capable of automatic work function/Fermi-level monitoring operating in ambient, controlled atmosphere (nitrogen, humidity) and using a custom head unit, UHV over a wide temperature range (4 – 1000K). Using a 1.24 – 3.1eV monochromatic light source, SKP can be extended to provide Surface Photovoltage Spectroscopy (SPS) which is an ideal tool for surface characterization of organic semiconductors and solar cells, allowing clarification of the energy band diagram and adsorption phenomena. This presentation will provide illustrative data on materials such as wide bandgap semiconductors (ITO), TCOs (TiN, TiO_2), nanometer thickness films and OLEDs.

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Bold page numbers indicate the presenter