Tuesday, May 12

2:00 p.m. IS-10 Advanced Sputter Magnetrons and Linear Ion Sources

J. Madocks, General Plasma, Inc., Tucson, AZ

With the acquisition of Advanced Energy's linear ion source product line in 2008, General Plasma is the world leader in high performance ion sources for solar, glass and web applications. In a whirlwind tour, attendees are shown the latest in ion source performance statistics and application examples. This is a quick overview to leave time for presentation of General Plasma's new Compact End Block for rotary magnetron sputtering. The innovative end block has mechanical water seals, ferrofluid vacuum seals and is only 100mm long! Any time left will be used to share the latest user data from our Moving Magnet Planar Magnetron. Exciting stuff!

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2:10 p.m. IS-11 Controling Utilization and Uniformity

R. Newcomb, Angstrom Sciences, Inc., Duquesne, PA

Angstrom Sciences has developed a magnetron with an electromagnetic coil that enables you to Control the Plasma across the surface of the target.

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2:20 p.m. IS-12 Technology Update: NanoBonding of Sputter Targets

M. O'Neill and A. Duckham, Reactive NanoTechnologies, Inc., Hunt Valley, MD

NanoBond® is a process that enables solder bonding of materials in nanoseconds. This is accomplished by inserting a sheet of NanoFoil® in between two surfaces prepared with prewet solder. Under pressure, the NanoFoil® is ignited and serves as an embedded, sacrificial heat source. The soldered assembly is bonded with no evidence of deflection or stress created by the bonding process. The NanoBond® process has been adopted by several companies who bond sputter targets to a backing plate. NanoBond® is used to bond metal and ceramic oxide targets to a range of backing plate materials. In many cases these combination possess a temperature coefficient of expansion mismatch (TCE). The NanoBond® process only heats the interface being bonded, avoiding any stress or deflection due to the mismatch, creating a strong and reliable bond. Due to the flexibility in using any solder, the NanoBond® process enables higher power sputtering, reduction or elimination of arcing, use of lighter and less expensive backing plates, and an overall increase in sputter tool uptime. Several recent case studies of successful sputter target bonding will be presented.

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2:30 p.m. IS-13 Deposition Tolerant Langmuir Probe

D. Gahan, National Centre for Plasma Science and Technology, Dublin, Ireland; and B. Dolinaj and M.B. Hopkins, Impedans Ltd., Dublin, Ireland

In a standard Langmuir probe system, the monitoring of plasma parameters during plasma deposition is limited by the effects of probe surface contamination. A number of issues arise: i. A Langmuir probe immersed in the plasma during deposition processes is subjected to the deposition of a layer resulting in a large disturbance of the probe characteristic. Surface contamination changes the work function, resulting in a shift of the probe characteristic and/or in hysteresis in the I-V Characteristic. The formation of dielectric layers causes the slope of the characteristic to become shallow and eventually reduce the current to zero. This problem is addressed in current Langmuir probe systems based on electron or ion cleaning but limits the probe operation to plasma with low deposition rates. ii. A poor ground return path for the electron current causes shifts in the plasma potential. While this problem is addressed in modern probe systems by using a floating reference probe to compensate for low frequency effects, in deposition plasmas the reference electrode cannot be cleaned by electron bombardment and may be become insulating. The poor electron ground return is made worse by insulating coatings on the wall. In order to produce a Langmuir probe that can operate well in deposition plasma we have introduced a high frequency swept probe. The probe attains a DC bias negative relative to the plasma potential and draws a net current close to zero. The probe records the AC IV characteristic or complex impedance of the sheath and determines the plasma parameters. This technique is valid even in the case of a fully insulating layer forming on the probe surface. The probe draws little net current and minimal ground return is required. We show that the plasma to ground sheath capacitance provides sufficient current during the electron collection period. A unique feature of the probe is the ability to attain a bias voltage above the plasma potential even when coated with a non-conducting layer. We show results of the system in an O_2/N_2 plasma and compare the swept probe with a standard Langmuir probe.

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2:40 p.m. IS-14 Investigation of Creep Behaviour with a New Innovative Nanoindentation Tester

N. Conte and R. Consiglio, CSM Industries SA, Peseux, Switzerland; and N. Randall and E. Skopinksi, CSM Instruments Inc., Needham, MA

Nanoindentation testing is particularly appropriate for creep and stress relaxation tests because it can measure materials whose properties are highly viscoelastic. However, the main drawback of nanoindentation tests is linked to the low thermal stability of most instruments. These instabilities introduce an uncontrollable penetration drift superimposed to the viscoelastic deformation of the sample. For some very thin coatings, thermal expansion of the instrument frame can cause significant measurement error. The recent development of a new innovative instrument (the Ultra Nanoindentation Tester) has allowed such drawbacks to be avoided, and has allowed the precise investigation of the creep behaviour of samples using very long duration tests. These results were made possible thanks to a quasi elimination of the thermal drift by the use of specific dedicated materials with very low thermal expansion coefficients and a special design of the measurement head. Furthermore, the influence of the deformation of the frame has been eliminated due to an active top referencing which continuously monitors the position of the surface of the sample through a reference applying a very small and controlled pressure. A series of long time quasi static tests various coatings and will be used to demonstrate the efficiency of this novel instrument design and ability.

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2:50 p.m. IS-15 Surface Modification by 3D Nano Coatings

M. Fliedner, Cotec GmbH, Karlstein, Germany

Easy-to-clean coatings are a special kind of protection coating, only a few nanometers thick, against mechanical stress, watermarks, fingerprints, dust, grease and so on. The combination of coating systems and an ultra hydrophobic material will leave a long lasting coating. The hydrophobic and olephobic performance will remain the entire lifetime of the product. New test equipment and background data on the physical basis of these properties are presented. Surface characterization was performed by electron microscopy and detailed contact angle measurements.