

NCCAVS Thin Film Users Group (TFUG)

Virtual Meeting

"Metrology"

May 28, 2020

May 28, 2020
2:00-3:30 p.m. PST
Please check time accordingly:
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Zoom login Details

When: May 28, 2020 02:00 PM Pacific Time (US and Canada)
Topic: Metrology

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Organizing Committee:

Daniel Sullivan, EAG Laboratories
Duane Bingaman, Kurt J. Lesker Company
Jacques Matteau, Protechmaterials
Mayu Yamamura, Applied Materials
Michael Oye, UC Santa Cruz, moye@ucsc.edu
Robert Kertayasa, Lumina Instruments
Zoran Misetic, Kurt J. Lesker Company, zoranm@lesker.com

AGENDA:

2:00 pm: Intro and Welcome

2:05 pm: *Advanced film adhesion characterization by scratch testing*
Pierre Morel, VP for applications at Rtec Instruments

2:25 pm: *Golden Eye for the IoT Age - Industrial Applications of Transmission Electron Microscopy*
Dr. Peng Zhang, EAG Laboratories

2:45 pm: *X-Ray Diffraction From the Easy to the Hard*
Chris Moore, VP Technology, Covalent Metrology

3:05 pm: *Thin Film Measurements by Multi-Wavelength Ellipsometry*
Blaine Johs, Filmsense LLC

3:30 pm: Adjourn

ABSTRACTS AND BIOS:

Advanced film adhesion characterization by scratch testing, Pierre Morel, VP for applications at Rtec Instruments

The scratch test is often used to induce stresses capable of fracturing the coating and delaminating it from its substrate hence yielding a better understanding of the coating adhesion. The ability to study both cohesion and adhesive failures with one test presents some advantages for both the researchers and the industrial engineers trying to improve their coating products. For the last 25 years scratch testing mainly relied on simple 2D microscope images to analyze failures. The introduction of confocal technique to this test provides a deeper understanding of the failure mechanisms in this valuable coating test.

Biography: Pierre Morel is the VP for applications at Rtec Instruments. Using 20 plus years in material testing instruments, he brings his expertise in scratch, indentation and tribology to Rtec Instruments for surface characterization testing solutions.

Golden Eye for the IoT Age - Industrial Applications of Transmission Electron Microscopy

Dr. Peng Zhang, EAG Laboratories

It is generally accepted that "A picture is worth a thousand words". Nowadays, transmission electron microscopy (TEM) is widely employed to provide pictures with atomic-resolution. With recent development of instrumentation and data processing algorithms, TEM can now provide measurements with astonishing precision and accuracy. In this short presentation, I will go through the fundamentals of TEM. Then we will introduce several real-life examples for accurate dimension measurement, particle size analysis, interface sharpness quantification, and strain characterization.

Biography: Dr. Peng Zhang is a Senior Director of Advanced Imaging Services at EAG Laboratories. He received Ph.D. in Materials Sciences from the University of California, Berkeley in 2006. At EAG, Peng is responsible for establishing new TEM applications.

X-Ray Diffraction From the Easy to the Hard, Chris Moore, VP Technology, Covalent Metrology

X-Ray Diffraction (XRD) is one of the mainstay tools in the tool box of techniques a material scientist, engineer, or developer uses. It is also one of the most misunderstood techniques in terms of real world (as opposed to theoretical) capability. Thus, one could spend days (and some do) on the topic and its issues since both cover a large variety of situations.

In this talk we will have a short discussion of the fundamentals of why you get a signal, some common measurement configurations, and some practical applications. While presenting the applications we will discuss some of the best-known methods for working with the data as well as the problems that can arise with analysis.

Like many techniques, getting the data can be the easy part of the measurement and incorrect data can look convincing. So we will discuss how you analyze a data set in particular for powder diffraction and high resolution thin film measurements. After the talk we hope you will have a better understanding of the technique, its uses, some limitations, and you will be able to interpret XRD results at a higher level.

Biography: As a research professor in physics at the University of Waterloo back in the mid-1980s, Chris was among the original founders of a company called Waterloo Scientific. He left academia and has since had a diverse and extensive career in metrology and characterization, designing and building instruments, heading sales organizations, and serving as CEO of both Philips Advanced Metrology Systems and SemiLab North America. We meet a lot of people in this field and have never met anyone with quite the same breadth in depth in the range of techniques that are the tools of our trade. We hope you enjoy his presentation.

Thin Film Measurements by Multi-Wavelength Ellipsometry, Blaine Johs, Filmsense LLC

Accurate and timely measurements of thin film thickness are critical for accelerating the development of new deposition and etch processes, and for quality control of existing processes. Ellipsometry is a fast, non-destructive optical technique that provides sub-Angstrom thickness sensitivity, and is ideal for such applications. In this talk, the benefits and applications of Multi-Wavelength ellipsometry will be presented. In particular, the advantages of performing in situ ellipsometry will be highlighted by two applications involving in situ monitoring of ALD deposition: Ru thin film deposition enabled by a Pt seed layer, and real time characterization of TiN film thickness and resistivity.

Biography: Blaine Johs is the President and Founder of Film Sense LLC, which manufactures Multi-Wavelength Ellipsometer systems. Prior to founding Film Sense in 2013, he was the Director of Research at the J.A. Woollam Company for 23 years. Mr. Johs holds over 100 ellipsometry related patents, and has co-authored over 100 publications on ellipsometry applications, data analysis methods, and instrumentation.