NCCAVS – TFUG Virtual Meeting
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Topic: Advances in Metrology

Meeting Date: July 28, 2021
Time: 1:30-4:00 p.m. PDT (Time Zone Converter Tool)
Platform: Zoom Webinar

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ABSTRACTS/BIOS

Vidumin Dahanayake, Anton Paar, *Zeta potential as an indicator of solid surface chemical properties*

Successful development of a material for a targeted application requires in depth knowledge of surface chemical properties. Different coatings, treatment and surface functionalizations are done to bring about desired properties. Demands for a rapid analysis of the solid interface in its native environment is crucial for these applications
Zeta potential is an interfacial property that describes the charging behavior of surfaces. Through streaming potential and current methods, it can also give information on relative wettability and adsorption kinetics. Herein we will discuss applications spanning from thin film surface modifications, self-assembled monolayers, wafer cleaning efficiency, chemical mechanical polishing, membrane fouling, cosmetics to textiles.

Bio: Vidumin Dahanayake is the Business Unit Characterization Product Specialist for the Anton Paar USA Western Region team. He holds a Ph.D in chemistry from Georgetown University, where his focus was the synthesis of metal-oxo clusters and mini emulsion polymerization of magnetic nanobeads for MRI contrasting and cancer diagnosis. He has many years of material and particle characterization experience spanning different industries.

Sung Park, Molecular Vista, *Molecular Analysis of Nanoscale Defects and Residue*

Abstract: Nanoscale defects become prominent as film thickness and feature sizes decrease in today's manufacturing processes. While many analytical techniques provide elemental information of nanoscale defects, they are less useful with materials with same constituent elements as in many organic and inorganic materials since they do not reveal any chemical bonding information. Current array of tools for molecular analysis are limited in their spatial resolution, at around 500 nm. For defects below this size, it is common to encounter the use of many analytical techniques in combination just to "guess" the molecular nature of the defects; the situation worsens if the defect is very thin (< 100 nm) also since some techniques have poorer SNR at these thicknesses. IR PiFM (Photo-induced Force Microscopy) is well suited for the molecular analysis of nanoscale defects and residues due to its excellent spatial resolution and sensitivity. Unlike the guess work based on the results of multiple analytical techniques described above, PiFM in many instances will generate a definitive identity of the defect based on well-established FTIR spectra. Even though PiF-IR spectra are generated from ~ 10 nm regions, they match the bulk FTIR spectra remarkably well and thus can be used to identify defects as small as ~ 10 nm and films as thin as a monolayer. IR PiFM analysis on various nanoscale defects and thin films will be presented to demonstrate its capability.

Bio: Sung is the CEO of Molecular Vista, which he co-founded with Prof. Kumar Wickramasinghe (UC Irvine, formerly of IBM) in 2011 to provide research and industrial tools for rapid and nanoscale imaging with chemical identification. Sung has over 25 years of experience of industrial R&D, engineering, marketing and sales, and operations. In the scanning probe field, he co-founded Park Scientific Instruments (PSI), which was one of the

first commercial companies to develop and sell scanning tunneling microscopes (STM) and atomic force microscopes (AFM). Prior to founding Park Scientific Instruments, he worked as a post-doc at IBM Watson Research Center. Sung earned his Ph.D. in Applied Physics from Stanford University and BA in Physics from Pomona College.

Steven W. Meeks, Lumina Instruments, *Contamination on Transparent and Opaque Materials*

There has been a growing interest in bonding glass to silicon substrates. In many cases glass is used as a carrier for the silicon wafer. Contamination on glass and/or silicon can have a major effect upon the ability to bond glass and silicon. This is particularly important when glass substrates are reclaimed after debonding from the silicon substrate. One major issue is the inspection of glass for organic residue (and other defects) which remain on its surface after the glass has been processed. Contamination on silicon can cause yield issues during the production process. This talk will present a solution to the problem of inspecting a transparent or opaque surface for sub nanometer films of organic residue. Several examples will be presented including the detection of sub nanometer films on a reclaimed glass wafer and contamination on a patterned silicon wafer. Another example is the surface damage on glass produced during the reclaiming process.

Bio: Steven Meeks- President Lumina Instruments. Ph.D. Applied Physics Stanford Univ. More than 30 years experience in instrumentation development. Co-founder and CTO of Candela Instruments, VP of Technology at KLA-Tencor, 60+ patents. http://www.lumina-inst.com/

Dan Sullivan, EAG Laboratories, *Surface contaminant analysis by TOF-SIMS and SEM/EDX*

Examples include film contaminants on glass wafers, which are contaminants found with the Lumina Optical Scanner described by Dr. Meeks in the previous talk. This presentation will focus on the TOF-SIMS and SEM/EDX to identify the thin film contaminants on glass.

Bio: Started at Surface Science Labs in the 1980's and have managed labs for Failure and materials analysis as well as reliability in startups and large corporations for thirty years. Moved over to sales and marketing two years ago.
Regional Sales Manager
PhD Chemistry UC San Diego
BS Chemistry UC Berkeley
30 years in industry