## Exhibitor Workshops
## Room: Exhibit Hall 1 - Session EW-WeM

## Exhibitor Workshop
**Moderator:** R.A. Langley, Consultant

10:20am **EW-WeM8 RJ Lee Group's Advanced FESEM/STEM and XPS Analytical Services for Exploring the Nano-World**, ***B.R. Strohmeier***, *K.L. Bunker, J.D. Piasecki*, RJ Lee Group, Inc.

RJ Lee Group, Inc. (RJLG, www.rjlg.com ) is an organization of experts who provide the highest quality microscopy, analytical, and consulting services to our clients and partners. Leading organizations come to RJLG for more than data and information; they come for an innovative approach and technical solutions developed through our commitment to quality, reliability, and customer satisfaction. RJLG is presently the exclusive commercial analytical testing laboratory in the United States to offer analytical services with: 1) the Hitachi S-5500 electron microscope, which combines field emission scanning electron microscopy (FESEM) and low kV scanning transmission electron microscopy (STEM) with energy dispersive X-ray spectroscopy (EDS) and 2) the Thermo Fisher Scientific K-Alpha X-ray photoelectron spectroscopy (XPS) instrument. The S-5500 and K-Alpha are two of the most powerful materials and surface characterization instruments available to scientists today. This presentation will give a brief overview of the advanced capabilities of each instrument along with examples of applications of these instruments for the characterization of nanomaterials.

The highlight of the Hitachi S-5500 electron microscope is the cold field emission electron source and the in-lens technology, which together achieve the world's highest secondary electron imaging resolution of 0.4 nm at 30 kV. The electron optical design of the Hitachi S-5500 places the sample at the optimum analytical and imaging working distance, allowing concurrent acquisition of high-resolution FESEM and STEM images, as well as EDS information. A variety of signals can be collected simultaneously including secondary electron and backscattered electron FESEM images and bright field (BF) and dark field (DF) STEM images. Combining this instrument with new silicon drift detector (SDD) technology (Bruker 30 $mm^2$) allows for high resolution elemental analysis and mapping of nanostructures. Therefore, the S-5500 can obtain unique information on samples that single standard microscopy techniques, such as SEM and TEM, are not able to accomplish when used alone.

XPS is a highly surface-sensitive and quantitative technique for materials characterization. The Thermo Fisher Scientific Model K-Alpha XPS is a compact, fully integrated, state-of-the-art instrument, with many outstanding features such as: 1) a high intensity, monochromatic, Al Kα X-ray source with an analytical spot size that can be easily varied from 30-400 µm, 2) a high transmission, high spectral resolution, electron energy analyzer, 3) a high sensitivity multi-channel detector, 4) a versatile sample stage capable of handling large or multiple samples with various sample mounting options, 5) *in situ* optical sample viewing and positioning, 6) elemental and chemical state surface mapping capability, 7) high quality depth profiling performance, 8) an unprecedented, highly automated, operation intended for non-expert and multi-user environments, and 8) advanced data processing software. Nanometer scale sampling depth and its ability to provide chemical state information makes XPS an ideal analytical technique for investigating the elemental and chemical surface composition of nanoparticles and other complex advanced materials.

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