

Tuesday Afternoon, October 19, 2010

Exhibitors & Manufacturers Technology Spotlight

Room: Southwest Exhibit Hall - Session EW-TuA

Exhibitors & Manufacturers Technology Spotlight

Moderator: D.J. Surman, Kratos Analytical Inc., R.

Langley, Consultant

3:40pm EW-TuA6 **RJ Lee Group's Advanced FESEM, STEM, and XPS Analytical Consulting Services for Exploring the Nano-World.**
K.L. Bunker, J.L. Sturgeon, T.L. Lersch, B.R. Strohmeier, 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's multi-technique approach to materials characterization offers comprehensive solutions to complex problems. RJLG is presently the exclusive commercial analytical laboratory in the United States to offer analytical services with a number of advanced instruments that provide unique complementary information for the study of nanomaterials. These instruments include: 1) Hitachi S-5500 ultrahigh resolution electron microscope, which is capable of performing field emission scanning electron microscopy (FESEM) and low energy (30 kV) scanning transmission electron microscopy (STEM); 2) Hitachi HD-2300 high energy (200 kV) STEM, which can also generate FESEM images; and 3) Thermo Scientific K-Alpha X-ray photoelectron spectrometer (XPS). The S-5500, HD-2300, and K-Alpha are three of the most powerful materials and surface characterization instruments available to scientists today. The electron optical designs of the Hitachi S-5500 and HD-2300 microscopes place the sample at the optimum imaging and analytical working distance, allowing concurrent acquisition of high-resolution FESEM and/or STEM images, as well as energy dispersive X-ray spectroscopy (EDS). Both microscopes are equipped with the latest silicon drift detector (SDD) technology for EDS, which allows for high resolution elemental analysis and mapping of nanostructures. A variety of signals can be collected simultaneously including secondary electron (SE) and backscattered electron (BSE) FESEM images and bright field (BF) and dark field (DF) STEM images. A semiconductor-based Protochips Aduro™ sample heating system allows for *in situ* microscopic analysis at elevated temperatures up to 1,200 °C. Therefore, the S-5500 and HD-2300 can provide 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 surface analysis instrument. 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. This presentation will give a brief overview of the advanced capabilities of each instrument along with examples of combined applications of these instruments for the characterization of nanomaterials.

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