A204 New Sampling Methods for the Simultaneous Analysis of Trace Particle Evidence by Optical and Scanning Electron Microscopy

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After attending this presentation, attendees will be able to more effectively collect and microscopically evaluate particle evidence by streamlining the collection, preparation, and analysis processes.

The presentation will impact the forensic science community by providing attendees with knowledge of new sampling tools and ways to combine and simplify the sample collection and comprehensive microscopic analysis (both Optical and SEM) of trace particle evidence. The advantages of combining these analytical methods will be illustrated.

Until recently, a major roadblock to both practical and comprehensive analysis of trace particle evidence was the different sample mounting procedures required for analysis by Optical Microscopy and Scanning Electron Microscopy. Typically, particles or fibers analyzed by Polarized Light Microscopy had to be removed from adhesive tape, mounted on a separate glass slide, and appropriate stains or refractive index oils applied. If SEM and X-ray analysis was then required, the particle would need to be cleaned and mounted on a separate specimen stub for SEM analysis. These preparation procedures are often impractical, time consuming, and run a high risk of evidence loss. Furthermore, analyzing intact distributions of particle evidence cannot be simultaneously examined by both PLM and SEM. Over the past three years, extensive research has resulted in the development of a universal adhesive sampling media suitable for both optical and electron microscopy. This media has now been incorporated into practical field sampling devices.

This presentation focuses on using the new media in two types of commercially available sampling devices. Both devices were originally researched and developed for use in indoor air quality dust analysis, but also solve the same problems encountered for forensic particle evidence analysis. The new media is unique as it is very tacky, has high optical clarity, is resistant to alcohol, and stable in refractive index oils. At the same time, it provides a smooth background and high stability under vacuum and resistance to electron beam damage. Simplified preparation procedures allow Polarized Light Microscopy analysis, and then direct analysis by Scanning Electron Microscopy without any complex sample preparation. **Microscopy, Particle, Sampling**

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