



## Engineering Sciences Section – 2005

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### **C45 Source Determination of Fugitive Particulate on Parked Automobiles by Environmental Forensic Microscopy**

*Richard S. Brown, MS\*, MVA Scientific Consultants, Suite 200,  
5500 Oakbrook Parkway, Norcross, GA 30093*

The goal of this presentation is to present to the forensic community information about how the microscopical analysis of particles discovered on parked automobiles can be used to identify the source of the particulate and determine liability for remediation.

This presentation will impact the forensic community and/or humanity by demonstrating the use of microscopical techniques in determining their origin.

The microscopical analysis of dark brown resinous particulate collected from the surface of parked automobiles, identified a possible source of the dark brown resinous particles to be from a nearby manufacturing plant. A combination of polarized light microscopy (PLM), Fourier transform infrared microspectroscopy (FTIR) and scanning electron microscopy was used to characterize the particles collected from the parked automobiles. Particles collected from exhaust fan vents at a nearby manufacturing plant were characterized using the same microscopical techniques. The particles collected from the exhaust vents of the manufacturing plants were determined to be similar in chemical and physical composition to the particles collected from the parked automobiles.

The classification of unknown materials and particles by techniques developed by microscopists enable the environmental forensic microscopist to eliminate natural sources such as insect excretions and narrow the possible sources of a particulate emission that was damaging the painted surfaces of automobiles parked in close proximity to exhaust vents that were releasing the offending material into the environment. The procedures used to classify the particle emission involved collection and classification using techniques that can only be performed with the aid of a microscope.

The source of the particulate could not be identified to the extent that it was the only source to the exclusion of all other potential sources, however, the microscopical examinations did reveal a strong association between the particulate emissions of one manufacturing facility and the particles collected from the parked automobiles.

Environmental forensic microscopical analyses are used to determine a possible source of fugitive particulate emissions that were damaging the painted surface of automobiles parked nearby.

**Particles, Microscopy, Forensic**