



### **B134 Self-Cleaning Window Glass: A New Subclass of Glass Trace Evidence**

*Robert D. Blackledge, MS\*, Naval Criminal Investigative Service Regional Forensic Laboratory, 3405 Welles Street, Suite 3, San Diego, CA; and Faye Springer, BS, Sacramento County District Attorney Crime Laboratory, 4800 Broadway, Suite 200, Sacramento, CA*

The goal of this presentation is to acquaint the forensic science community with a new subclass of glass trace evidence and to present the results of various chemical and physical methods of characterizing tiny pieces.

Criminals frequently gain entry by breaking glass windows. Although most of the broken pieces will fall away from the glass breaker, there will also be a fine spray of tiny fragments directed back towards the criminal. Also, it is likely that a high percentage of these tiny pieces will have originated from the surface of the pane that was towards the breaker. These fragments may be recovered from a suspect's clothing and may help provide an association between the suspect and the crime scene.

Self-cleaning window glass under the brand name of Activ™ Glass from Pilkington Glass was first introduced in 2001. In 2002, Pittsburgh Plate Glass introduced its own version of self-cleaning glass, SunClean® Glass. Both products are only intended for exterior windows, with the side having self-cleaning properties facing the outside. The self-cleaning treated side is always opposite the float glass side. Titanium dioxide at or near the outside surface interacts with ultraviolet rays from the sun to produce a catalytic effect that gradually breaks down organic dirt and grime to carbon dioxide and water. Because the treated surface is hydrophilic, rain (or water from a hose) sheets down the pane washing away any residues and leaving a surface free of water spots upon drying.

This presentation will illustrate various chemical and physical methods of characterizing self-cleaning glass. Methods that distinguish self-cleaning glass from ordinary float window glass and those that distinguish between the Pilkington and Pittsburgh Plate Glass products will also be discussed. Characterization methods used in this project include polarized light microscopy, microscopy with an interference objective, refractive index determinations, scanning electron microscopy/energy-dispersive spectroscopy, Raman microscopy, and laser ablation inductively-coupled mass spectrometry.

At the conclusion of the presentation free samples of these glasses will be available on the basis of one per laboratory.

#### **Trace Evidence, Glass Analysis, Self-Cleaning Window Glass**