D22 Proper Storage of Tape Evidence to Prevent Phthalate Interferences

Maureen J. Bradley, PhD, Preston C. Lowe, MS, Diana M. Wright, PhD, and Marc A. LeBeau, MS, FBI, Laboratory Division, 2501 Investigation Parkway, Quantico, VA 22135*

The goal of this presentation is to inform the forensic community about the potential for phthalate migration from vinyl document protectors to the adhesive of tape evidence. Alternative substrates for processing tape evidence will be presented.

This presentation will impact the forensic community and/or humanity by making the forensic community aware of the potential for a false disassociation of two tapes being compared if phthalate plasticized substrates are used to store tape evidence. Alternative substrates will be presented.

Forensic laboratories are frequently tasked with the examination of tape evidence to establish a possible evidentiary link between a suspect and a particular crime, or between different crimes. Tape associated with the commission of a crime may have been used as a gag or bindings, to seal packages or threatening letters, or in the construction of an improvised explosive device. The sequence of examinations conducted within the laboratory is dictated by the probative value of a given examination and to minimize the potential for loss of valuable evidence. The sequence for tape examinations within the FBI Laboratory is: processing for trace evidence, such as hairs and fibers; processing for latent fingerprints; and finally, physical and chemical comparison or characterization of the tape components.

Tape evidence is routinely submitted as a tangled mass, in strips from ligatures and/or gags, or adhered to various substrates. Historically, when tape evidence was processed for collection of trace evidence or latent fingerprints, it was separated and laid out on vinyl document protectors. This material was convenient, provided a clean surface for the tape to adhere, provided an area to write the item identifiers, and allowed for easy removal of the tape for subsequent examinations. However, upon chemical examination of the adhesives of several tape specimens, it was discovered that the phthalate-based plasticizers used in the vinyl (PVC-based) document protectors migrated into the adhesive. This proved to be problematic when comparing questioned tape specimens, which had been adhered to document protectors, to suspect sources of tape, which had not.

This presentation will demonstrate several case examples where differences were noted in the pyrolysis-GC/MS adhesive data of tape specimens being compared. Different phthalates were detected in the pyrograms of various questioned tape adhesives that were not present in the suspect sources. All other parameters measured for the tape specimens (width, thickness, FTIR of adhesive and backing, and SEM/EDS of adhesives) were comparable. Further examinations revealed that the phthalates present in the adhesives of the questioned tape specimens could be accounted for as a component of the vinyl document protectors the tapes had been adhered to. The migratory nature of phthalate-based plasticizers is well established in literature. Although accounted for, analysis of each vinyl document protector requires additional sample preparation and instrumentation time. Alternative substrates to vinyl document protectors will also be presented.

Tape Evidence, Phthalate Plasticizers, Contamination

 ** Presenting Author*