

EVALUATION OF SUPERGLUE FUMING

Written by Gary Gulick

CYANOACRYLATE ESTER has been around for a long time and almost everyone involved in crime-scene investigation has either used it or at least heard about it. Superglue fuming is now a part of the workday life. It started out as a relatively small and simple technique that helped make latent fingerprints visible. But superglue fuming has grown and evolved into a number of complex methodologies, each with its own set of pros and cons.

John Olenik is a well-known latent-fingerprint specialist who retired a few years ago from the Ohio Bureau of Criminal Identification and Investigation after more than 27 years of crime-lab experience. Olenik has experimented extensively with superglue fuming and has even developed several successful products that are related in one way or another to the technique. In his spare time, he also conducts workshops on superglue fuming. When asked to provide an evaluation of superglue fuming, Olenik was enthusiastically positive.

"Superglue has been available to the forensic community for more than 20 years," Olenik said. "And the police departments are finding that it's even more important now than it was years ago. No other process has been found to replace it. Nothing."

But Olenik also observed that in recent years he has become convinced that most departments are not properly using superglue fuming.

"I think some of the departments tend to over-fume their items because they are expecting to see dense, white ridges," he said. "And as a result, there are a lot of faint prints that may be on the surface that they will never be able to bring up anymore because they have been lost during the fuming process."

According to Olenik, the primary purpose of superglue fuming should really be to preserve the fingerprint evidence. "Your first objective should be to prevent the fingerprint evidence

from being damaged in any way—by dusting, by handling, by improper packaging, or by transportation. In my opinion, superglue is one of the best mediums we have to preserve prints so they can be properly processed and recorded by powders, dyes, or photography. Latent fingerprints are fragile. We need to protect them."

You are going to see more of superglue fuming in the future because more techniques are being developed all the time to enhance it. Every few months, someone comes up with new dyes or new techniques.

Superglue has been gaining more importance in recent years, even at the crime scene itself. Ten years ago, you would seldom see a CSI unit fuming with superglue in the field. But today, that action is a more common sight. Many departments, said Olenik, are superglue fuming right at the crime scene, instead of packaging the raw, potential evidence and transporting it back to the lab for processing later.

"At one time," he said, "superglue fuming was just a process that we used for most-difficult surfaces. But we've found out that we can lose a lot of fingerprint evidence unless we can somehow protect it during the move back to the lab. The U.S. Army Crime Laboratory discovered the same thing quite a few years ago. It seems they were receiving evidence from all over the world and some of it was being damaged. What they did was require all of their CID investigators to fume everything before it was shipped back

to the crime lab. They found that they had a 200-percent increase in viewable prints by fuming everything before it was shipped."

Olenik said that particular study was reported by David Perkins and William Thomas in the *Journal of Forensic Identification*, Vol. 41, No. 3, 1991. The data captured by the study showed that 3.29 latent prints were developed per case when the evidence was fumed in the field compared with 1.06 prints for evidence not fumed in the field.

Olenik pointed out that some items will be fumed properly and there will be white ridges that are easily visible. Other times, even though the items are properly fumed, you may not see any ridges. But the latent prints are still fixed. "Once they are fixed, they can be enhanced, either by using special fingerprint powders or with special dye-staining techniques."

Some faint prints may not even be made visible with powders because there is not enough print residue to hold the powder. When this occurs, dyes and special photographic techniques are the only ways to view these very faint prints. "Unfortunately, you can even lose this opportunity if you over-fume the faint prints with superglue. The fumes will coat both the surface of the prints and the background—and they will become totally obscured, eliminating any possibility of ever capturing these faint prints."

Olenik's concerns that superglue-fuming may be either under-utilized or improperly used has led him to turn his retirement years into an unrelenting schedule of educational opportunities.

"This is what I do," said Olenik. "I conduct superglue workshops in which I teach the various methods of superglue fuming that are out there. There is no single technique that I consider the best. I show people how to fume at a crime scene and in a laboratory environment and for different types of

applications. I even show them how to do superglue-fuming in large, high-volume areas where they might have to erect a tent or a big sheet of plastic over a potential source of evidence. It is not unusual for an investigative team to want to fume a large object, such as a car.”

When asked if the technology of superglue fuming will continue to grow and improve in future years, Olenik said it probably would—if for no other reason than the fact that many crime-scene units are not fully utilizing the potential of the technique.

“A lot of times, they are trying to do the fuming process without having the right environmental conditions,” Olenik said. “Consequently, they tend to miss a lot of evidence. If you study some of the literature on the subject, you will find that there are certain optimum conditions that are necessary for good development of the latent prints.


“One of the optimum conditions is temperature: It should be about 75°F.

“Another condition is the humidity level: It should be relatively high in order to get the best results.

“Finally—and I hope I’m not over-emphasizing this—you need to be very careful that you do not over-fume it.”

As far as the future of superglue fuming is concerned, Olenik is certain that there will be some major advances in the next few years.

“You’re going to see more of superglue fuming down the road. Consider this fact: There has been no technique developed so far that can even come close to replacing it. Instead, there are more techniques being developed all the time to enhance it. Every few months, someone comes up with new dyes or new dyeing techniques.

“Years ago, for example, they came up with laser dyes only to find that they couldn’t be used on latent prints because the solvents that carried the dye would dissolve the fingerprint residue. Then, they discovered that superglue fixed the print, while enabling the dyes to adhere to the print residue better. The result: A higher yield of latent fingerprints. Things just keep getting better!” 

For background information about John Olenik and his favorite topic—superglue fuming—you can visit his website:

www.detectoprint.com

NINE THINGS YOU MAY OR MAY NOT KNOW ABOUT SUPERGLUE (CYANOACRYLATE ESTER)

1 This year marks its 63rd anniversary—The basic formula that most people know as superglue was developed in 1942 during research into a special plastic that would be suitable for gunsights destined for battlefield use in World War II. But the stuff stuck to everything it touched and was not useable. Six years later, they tried again to use it—this time for airplane canopies. Nope.

2 Success the third time around—Since the stuff was so remarkably sticky, fast-drying, and stubborn, the researchers decided to try selling it as an adhesive. Kodak introduced it to the market as “Eastman 910” in 1958.

3 The inventor of superglue—The scientist who did all of that research back in 1942 was Dr. Harry W. Coover. At the time, Dr. Coover was employed by Eastman Chemical. Last year, Dr. Coover was inducted into the National Inventors Hall of Fame in Akron, Ohio, joining such prestigious inventors as Thomas Edison, Alexander Graham Bell, Henry Ford, Samuel Morse, and George Eastman.

4 A very versatile adhesive—From the very beginning, the cyanoacrylate ester adhesive was a popular product among homeowners. It bonds almost anything to almost anything else. But in 1966, a specially trained surgical team tested superglue as a temporary bonding agent for battlefield wounds suffered by servicemen in Vietnam. Today, cyanoacrylates are used for closing surgical incisions and other medical treatments. There is even a form of the glue being used in veterinary medicine.

5 Hazards of superglue compounds—Before you use any kind of superglue for any purpose, it would be a good idea to read the label for possible hazards. A common superglue adhesive purchased at the supermarket lists the following: “*May be harmful if inhaled. Liquid or vapor may cause irritation of nose, throat, and lungs. Bonds skin instantly. Causes irritation. Bonds eyelids instantly. Causes irritation.*” When heated for forensic purposes, other hazards could develop. Read the label and use proper personal-protective equipment.

6 How to un-gluglue superglue—Cyanoacrylate sets up in less than a minute and reaches its full strength in about two hours. Hardly anything can bother it. But acetone—a common ingredient of fingernail-polish remover—can soften dried superglue. Here’s another tip: Cold temperatures can cause superglue to become brittle—so you might try putting that mistakenly glued-together object in your freezer for a few hours and then see if you can separate the parts.

7 Superglue’s entry into forensics—Ed German, a latent-print examiner with U.S. Army Crime Laboratory, relates the early history of superglue fuming for latent prints at one of the pages on his website: www.onin.com/fp/cyano.html. It’s an interesting story: In May 1977, trace-evidence examiner Fuseo Matsumura at the Saga Prefectural Crime Laboratory of the National Police Agency of Japan happened to discover that superglue can make fingerprints visible. About four months later, Ed German and Paul Norkus of the U.S. Army Crime Laboratory in Japan brought the idea of the superglue technique into the forensic community of the U.S. Five years later, superglue was being sold as a forensic product.

8 How superglue works on latent prints—The magic is done by the fumes of the superglue. When the fumes come into contact with a latent-fingerprint deposit, the vapor selectively polymerizes on the fingerprint ridges by reacting with water and other components of the print. The residue will often result in white ridges that are quite visible. Sometimes, however, the post-fuming evidence must be processed with special lights, photography, powders, or dyes.

9 The reference material is out there—Before you get too involved with superglue fuming, it’s a good idea to do your homework. The professional journals are good sources. The Internet is full of good reference material—and the vendors of superglue-fuming products will also be more than happy to help.