Lumicyano™

The One-Step Fluorescent Cyanoacrylate Fuming Process

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Lumicyano™ Testing in MEGAfume with Validation

Lumicyano™ Testing Validation

Lumicyano, the one-step fluorescent cyanoacrylate fuming process, was developed in 2013 by Crime Scene Technology[1]. This technique is used by all forensic labs in France, the FBI, Scotland Yard, and more. The process is considered a revelation because it allows the fingerprints to fluoresce immediately without the second step of adding dye or powder[2]. Lumicyano can be used to develop latent fingerprints on semi-porous and non-porous surfaces such as glass, metal, and plastic. Lumicyano can be used instead of the classic method of cyanoacrylate fuming[3]. Therefore, it reacts the same way as cyanoacrylate. Both Lumicyano and cyanoacrylate react with the organic compounds such as amino acids, fatty acids, and proteins that are present in fingerprints[4]. Lumicyano will polymerize to form a pink solid that develops on the ridges in the prints. The reaction occurs in an Attestor MEGAfume fume chamber.

Different concentrations of the Lumicyano solution and settings on the MEGAfume were tested to determine the optimal results for different types of evidence including plastic, metal, and glass. The evidence that was processed included plastic cups, plastic bags, a metal bowl, and a glass cup. All evidence processed was generated by the researcher. All evidence was placed on the racks of the MEGAfume. The concentrations of the Lumicyano solution that were tested included 5%, 6%, 7%, and 8%. The settings on the MEGAfume that were adjusted were the relative humidity (70%, 75%, 80%) and fume time (20-minutes, 25-minutes, and 30-minutes). Each type of evidence was tested under the different conditions discussed.

The evidence was placed in the chamber. The solution was made by weighing out 100 mg (5%), 120 mg (6%), 140 mg (7%), or 160 mg (8%) of the Lumicyano powder and 2.0 g of the Lumicyano solution. These were measured into a supplied foil dish and mixed by swirling before being put into the MEGAfume on the hot plate. The metal vessel in the chamber was filled half-way with deionized water and placed on a heating block to be evaporated.

The chamber door was then shut and the process was started. Throughout the cycle, the evidence was observed to determine if the fingerprints were developing. After the cycle was completed, the evidence was removed from the chamber and photographed using the Attestor LABview

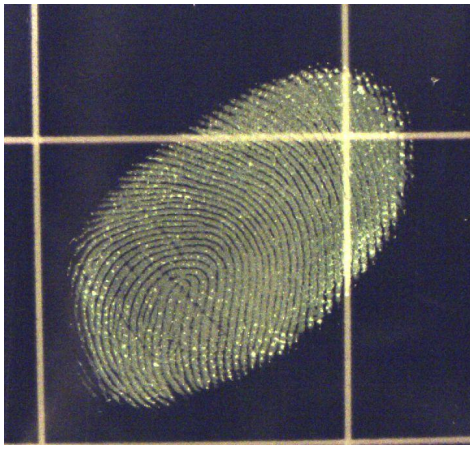
BV900 with a LIGHTcube using a wavelength of 505 nm. The photographs were then edited using Photoshop to be inverted and the contrast adjusted to aid in viewing the fingerprints.

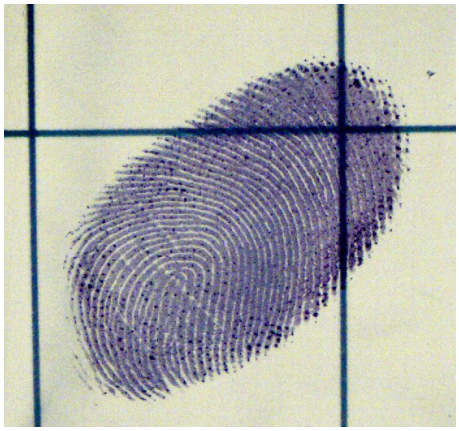
Attached are the unedited and edited photographs of the items processed with descriptions.

Conclusion: When developing latent fingerprints on plastic evidence, the optimal criteria is 5% concentration (100 mg powder, 2.0 g solution), 75% relative humidity, 10 minute saturation time, 120℃, and 20 minute fume time. Fingerprints developed at these conditions had the best outcome.

When developing latent fingerprints on metal evidence, the optimal criteria is 6% concentration (120 mg powder, 2.0 g solution), 75% relative humidity, 10 minute saturation time, 120℃, and 20 minute fume time. Fingerprints developed at these conditions had the best outcome.

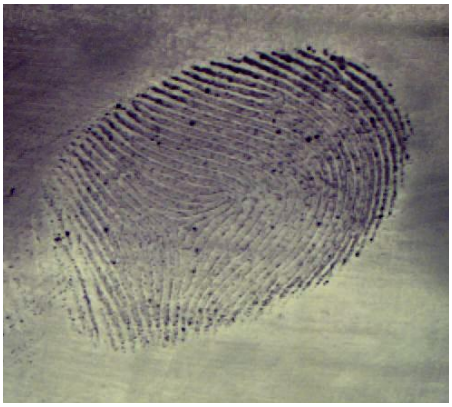
When developing latent fingerprints on glass evidence, the optimal criteria is 6% concentration (120 mg powder, 2.0 g solution), 75% relative humidity, 10 minute saturation time, 120℃, and 20 minute fume time. Fingerprints developed at these conditions had the best outcome.





Figures 1 & 2. Plastic Unedited Print & Plastic Edited Print, respectively.
5% concentration, 75% relative humidity, 10 minute saturation time, 120℃, 20 minute fume time.

Figues 3 & 4. Metal Unedited Print & Metal Edited Print, respectively.
6% concentration, 75% relative humidity, 10 minute saturation time, 120℃, 20 minute fume time.



Figues 5 & 6. Glass Unedited Print & Glass Edited Print, respectively.
6% concentration, 75% relative humidity, 10 minute saturation time, 120℃, 20 minute fume time.

References

1. CST - Crime Science Technology. https://www.linkedin.com/company/crime-science-technology.
2. Lumicyano. https://www.crimesciencetechnology.com/lumicyano-us.
3. FAQs about Lumicyano. https://www.crimesciencetechnology.com/faq-eng.
4. The Cyanoacrylate Fuming Method. https://www.soinc.org/sites/default/files/uploaded_files/forensics/For_supergluing.pdf?ad=semD&an=msn_s&am=broad&q=Cyanoacrylate+Fuming&o=12622&qsrc=999&l=sem&askid=1359afd9-bd94-40f8-bcca-66463c48b645-0-ab_msb.