Name(s)	Project Number
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Project Title

Just Microwave It: Developing Fingerprints with Microwave Radiation

Abstract

Objectives/Goals

I developed a new method for developing latent fingerprints on porous surfaces using microwave radiation. I compared my method to two other commonly used development methods and also optimized the development solution. I read several research sources and could not find indications that my method has been used in forensics labs.

Methods/Materials

I used the chemical ninhydrin which reacts with amino acids in sweat creating a purple fingerprint. To develop a fingerprint requires heat, and I compared my microwave method to the common methods of the steam iron and the conventional oven. I also compared acetone and ethanol solutions of ninhydrin which are both commonly used in forensics labs. Numerous fingerprints were analyzed by different people to determine which method gave the clearest and darkest fingerprints. I also optimized the development solution by testing artificial fingerprints. These were made by using different dilutions of a common amino acid dotted and dried on filter paper. This was done because it was easier to consistently measure the development rather than using actual fingerprints which vary from print to print.

Results

These experiments showed that the microwave heating method is a better method than the other two heating methods. The microwave prints were slightly darker and clearer than the prints obtained from the oven. Also, the microwave prints were not smudged like the ones heated with the steam iron. In crime labs, it is important not to destroy or alter the evidence. I noticed that the oven and iron heated samples started to curl at the corners, whereas my microwave heated samples stayed flat like the air dried ones. I also showed that the optimized solution for developing fingerprints using a microwave contains 1% water and 0.62% ninhydrin in ethanol.

Conclusions/Discussion

This project showed that using a microwave to develop fingerprints on porous surfaces is a very effective method. It conserves time and money, while providing a fingerprint that is clear and dark. I showed that using a ninhydrin solution in ethanol with 1% added water will make the darkest and clearest prints. I believe that my work will aid forensics labs across the country because my method is faster, gentler, and saves money.

Summary Statement

I believe that my new method of developing fingerprints on porous surfaces will aid forensics labs because it is more effective, convenient, and saves money.

Help Received

My dad helped me get the chemicals I used and helped with some of the planning of the optimization procedures.