

CRIME-LITE APPLICATIONS

Visualising fluorescent fingerprints developed using 1,2 Indandione

When 1,2 Indandione was first proposed as a fingermark development reagent in 1997, researchers quickly saw its potential as a low-cost alternative to DFO for the development of fluorescent marks on porous materials including paper.

To achieve the best possible results, most research suggests that evidence be dipped, washed, or sprayed with a working solution of 1,2 Indandione dissolved in ethyl acetate and HFE 7100, before being heated to 100°C for a period of time dependent upon the method of heating. Finally the evidence should be examined using either a BLUE/GREEN (445-510) or GREEN (515-570nm) forensic light source with fluorescence being observed via a ORANGE viewing filter.

Superior Results

This study, using 1,2 Indandione to develop marks on white and brown envelopes, demonstrates that superior results can be achieved by ‘trimming’ the output wavelength of the light source and ‘narrowing’ the visible bandwidth of the viewing filter.



Narrowband filters clip-on to the Crime-lite light sources

Test Conditions/Hardware

Having been sprayed with a 1,2 Indandione working solution, evidence was heated using a TFD-2 Thermal Fingerprint Developer, an ideal device for the rapid throughput of paper*.

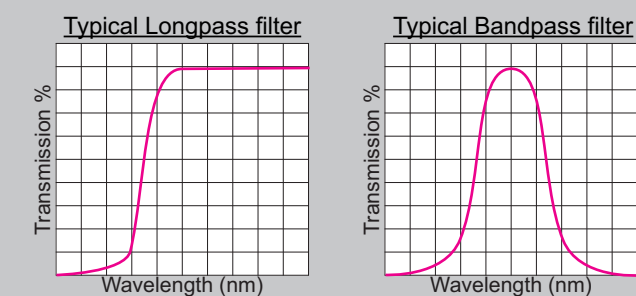
Tests were performed using **Blue/Green, and Green Crime-lite 82S light sources** both with and without output wavelength trimming filter.

<u>Light Source</u>	<u>Waveband</u>	<u>Trimmed</u>
Crime-lite Blue/Green	445-510nm	
Crime-lite Green	515-570nm	522nm

Evidence was then captured using a **DSLR-Camera** with a selection of **longpass** and **bandpass** viewing filters.

Filter

488nm Bandpass	550nm Longpass
495nm Longpass	560nm Bandpass
515nm Longpass	590nm Longpass
520nm Bandpass	610nm Longpass
530nm Longpass	630nm Longpass

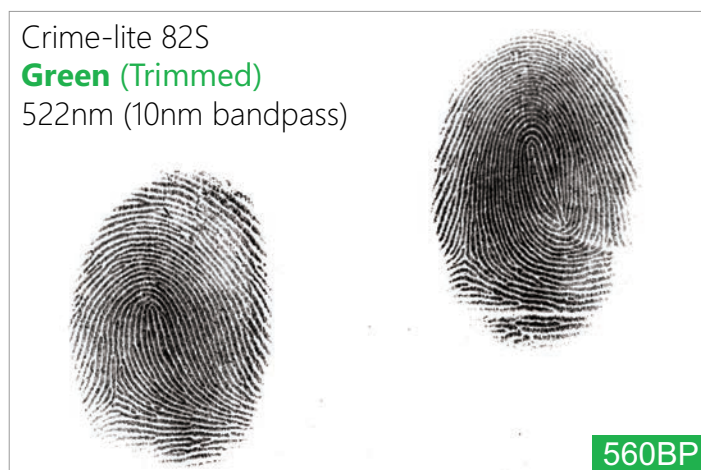
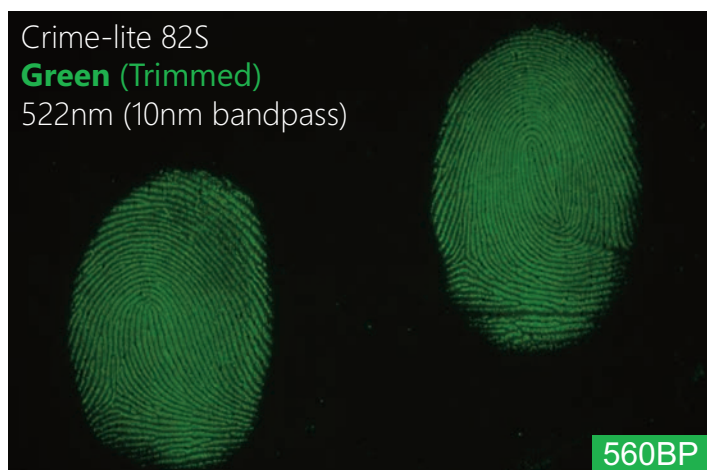
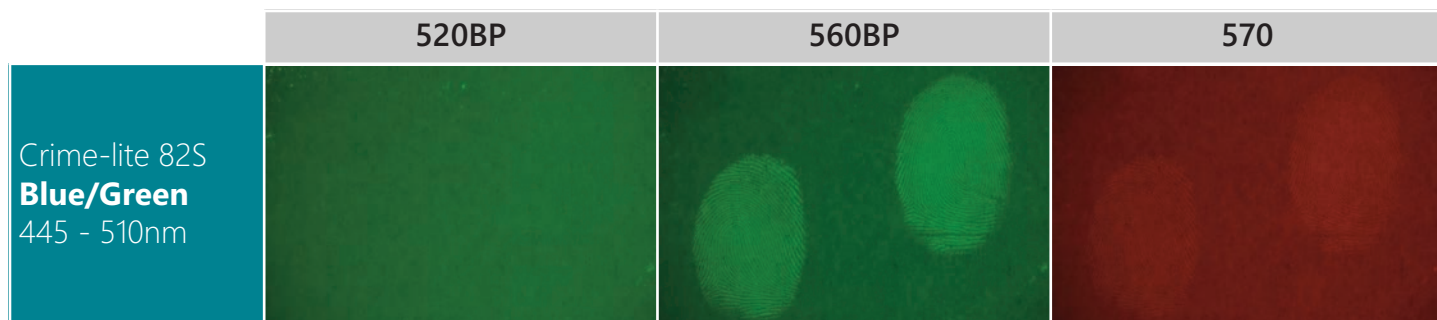
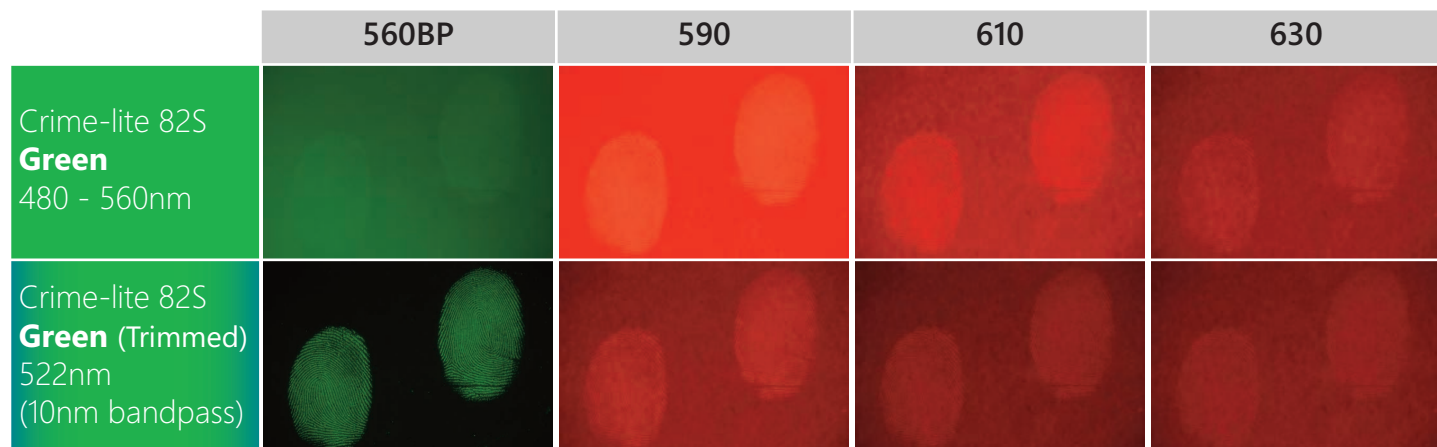


1,2 Indandione fluoresces under blue/green illumination

* Nicolosora, N., Downham, R., Dyer, R.M., Hussey, L., Luscombe, A. and Sears, V., 2018. A validation study of the 1, 2-indandione reagent for operational use in the UK: Part 2—Optimization of processing conditions. Forensic science international, 288, pp.266-277.

Fingerprints on White Paper

In our study, fingermarks were visible on white envelopes treated with 1,2 Indandione under all illumination/filtration conditions. However, there was a marked difference in the contrast and clarity of marks when viewed under trimmed Green illumination via a 560nm bandpass filter.



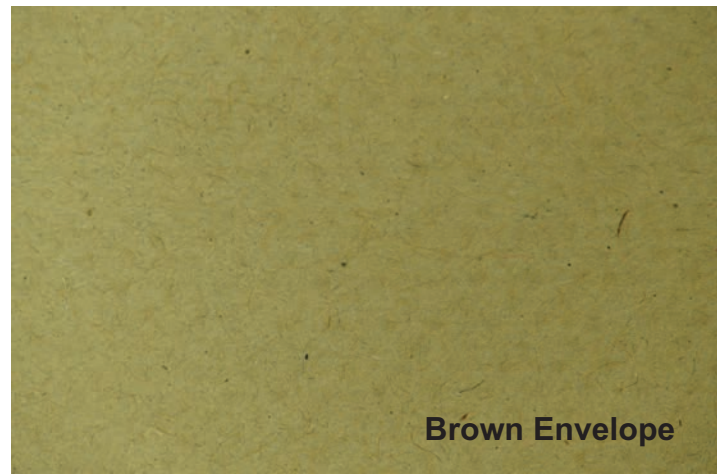
Using a TFD-2 Thermal Developer to Heat 1,2 Indandione

Suitable methods of heating 1,2 Indandione include using a Dry Oven, Heat Press (often a laundry press), hot air (via a hairdryer), or an infrared lamp as is used by the TFD-2. While each of these methods is capable of producing good quality results, each has its own unique advantages and drawbacks. A Hairdryer may be readily available but its application of heat is inconsistent, a heat press is efficient but requires physical contact with the evidence, a dry oven is purpose-built for the application but has comparatively slow processing times, the TFD-2 is rapid, consistent, and almost non contact but is not readily available in most labs.

Fingerprints on Brown Paper

In version 2.0 of the Fingerprint Source Book, CAST recognised that 1,2 indandione will ultimately replace DFO, initially on brown paper and card and then on other types of paper.

The highest quality results were achieved using a Green light source with trimmed output viewed through a 560nm bandpass filter.



	560BP	590	610	630
Crime-lite 82S Green 480 - 560nm				
Crime-lite 82S Green (Trimmed) 522nm (10nm bandpass)				

	520BP	560BP	570
Crime-lite 82S Blue/Green 445 - 510nm			

