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Real-Time Visualization of Latent Fingermarks with Level 3 details based on Solid State Emissive Organic Fluorophore Using Powder Dusting Method

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Table of contents

S.No	Contents	Pg. No
1.	Figure S1. ^{1}H NMR spectrum of probe **Py-Pr-OH** in DMSO-*d6*	S3
2.	Figure S2. ^{13}C NMR spectrum of probe **Py-Pr-OH** in DMSO-*d6*	S3
3.	Single Crystal X-Ray Diffraction	S4
4.	Table S1. Single crystal X-ray parameters of **Py-Pr-OH** at 298 K	S4
5.	Figure S3. a) Packing of the molecules when viewed along *c*-axis. b) Packing of the molecules when viewed along *b*-axis	S5
6.	Table S2. Solvent dependent properties of **Py-Pr-OH** in different solvents	S5
7.	Figure S4. Fluorescence spectra **of Py-Pr-OH** (10 μM) with different excitation wavelengths at room temperature in methanol.	S5
8.	Figure S5. Fluorescence spectra **of Py-Pr-OH** (10 μM) with different excitation wavelengths at room temperature in ethanol.	S6
9.	Figure S6. Fluorescence spectra **of Py-Pr-OH** (10 μM) with different excitation wavelengths at room temperature in 2-Propanol.	S6
10.	Figure S7. Fluorescence spectra **of Py-Pr-OH** (10 μM) with different excitation wavelengths at room temperature in THF.	S7
11.	Figure S8. Fluorescence spectra **of Py-Pr-OH** (10 μM) with different excitation wavelengths at room temperature in ACN.	S7

12.	Figure S9. Fluorescence spectra **of Py-Pr-OH** (10 μM) with different excitation wavelengths at room temperature in DMF.	S8
13.	Figure S10. Fluorescence spectra **of Py-Pr-OH** (10 μM) with different excitation wavelengths at room temperature in DMSO.	S8
14.	Figure S11. Fluorescence spectra **of Py-Pr-OH** (10 μM) with different excitation wavelengths at room temperature in water.	S9
15.	Quantum yield calculation	S9
16.	Figure S12. Normalized solid state emission spectra of **Py-Pr-OH** and **Py-Pyr-OH** with silica.	S9
17.	LFM development powder preparation method	S10
18.	LFM development procedure by powder dusting method	S10
19.	Figure S13. LFM developed on various porous and non-porous substrates such as currency, ceramic tile, plastic, plywood, CD, coin A) under daylight B) under UV light	S10
20.	Figure S14. LFM developed on aluminium foil of different volunteers a) volunteer 1; b) volunteer 2; c) volunteer 3; d) volunteer 4; e) volunteer 5	S10
21.	Figure S15. LFM developed on aluminium foil for aged sample a) after 7 days; a') after 15 days in ambient atmosphere and Stained sample b) before treatment; b') After treatment with **Py-Pr-OH.**	S11
22.	Figure S16. LFM developed on surfaces of common objects like a) coffee mug b) leather wallet c) calculator d) cardboard e) stapler under under day light a') coffee mug b') leather wallet c') calculator d') cardboard e') stapler under 365 nm UV light.	S11
23.	Figure S17. Anticounterfeiting labeling using **Py-Pr-OH** a) under natural light; a') UV light (365nm)	S11
24.	Figure S18. Fluorescence image of LFP developed using **Py-OH** after a) 7 days; b) 14 days; c) 30 days of ageing.	S11
25.	References	S12

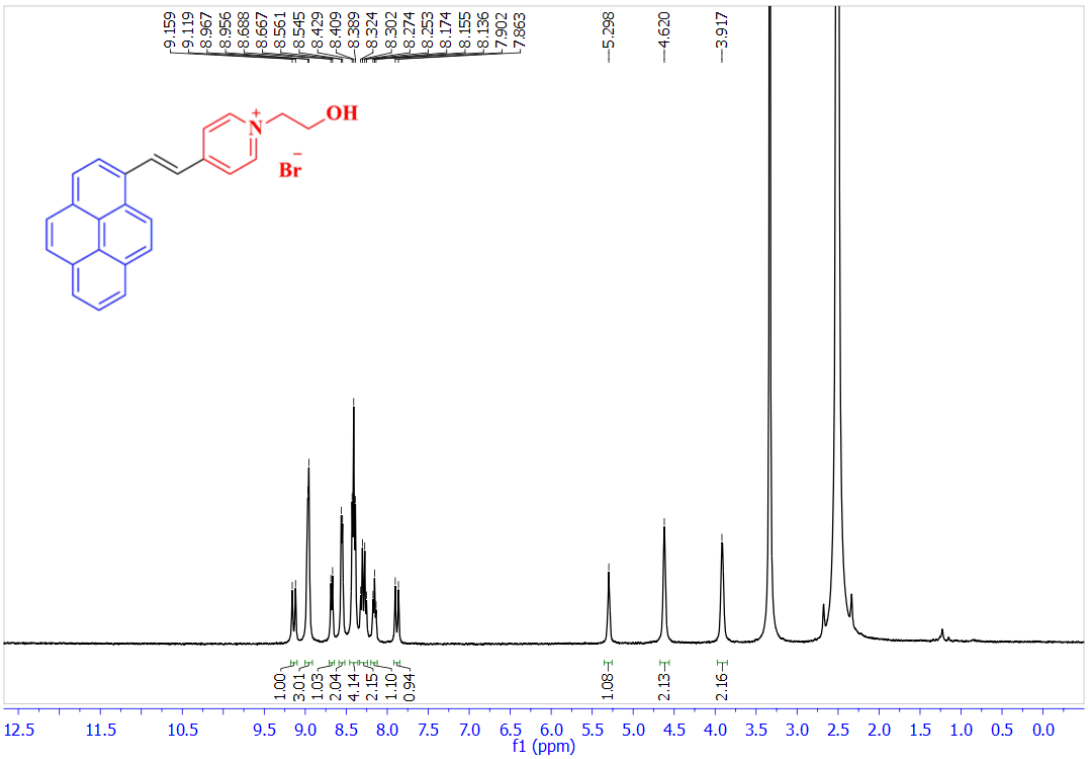

Figure S1. [1]H NMR spectrum of probe **Py-Pr-OH** in DMSO-*d6* .

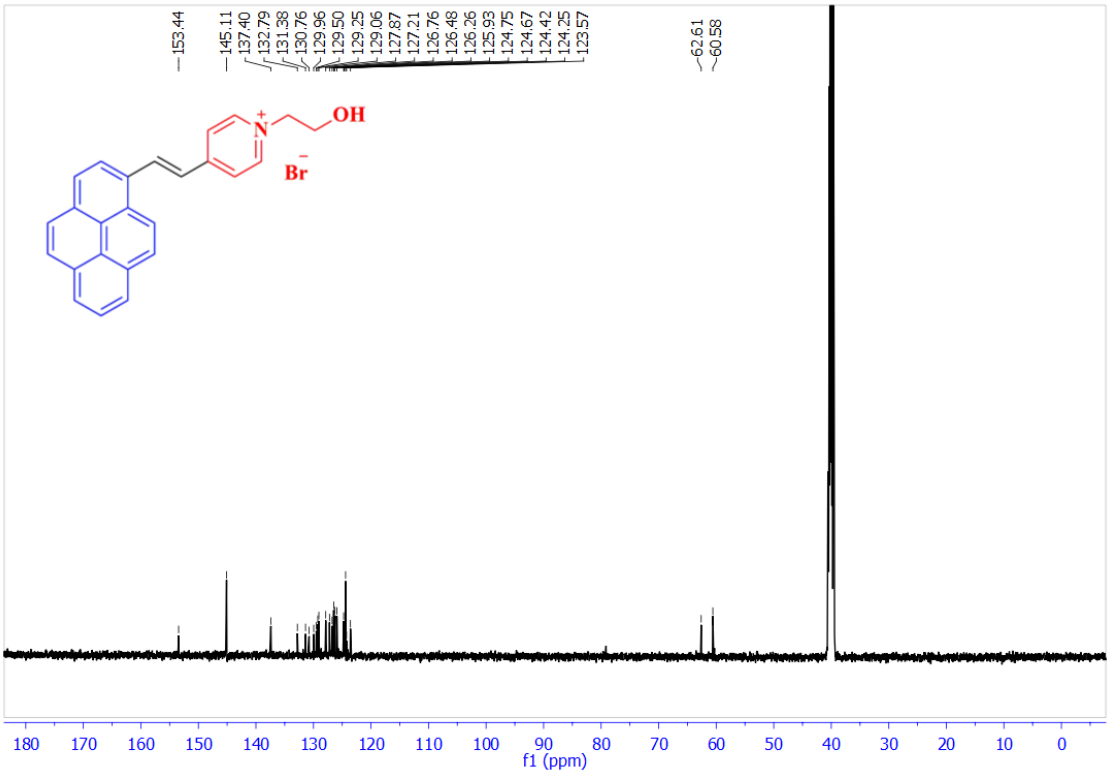

Figure S2. [13]C NMR spectrum of probe **Py-Pr-OH** in DMSO-*d6* .

Single Crystal X-Ray Diffraction:

The single crystal X-ray diffraction data of the **Py-Pr-OH** crystals were collected on a Microfocus D8 venture Bruker APEX 3 diffractometer equipped with a CCD area detector and having MoKα radiation (λ = 0.71069Å). SAINT program (v. 8.38A) was used for data reduction, which were analyzed for agreement using XPREP. All these software were included in the APEX 3 software suite (v 2017.3-0).[S1] Absorption correction was carried out with the SADABS program.[S2] The crystal structure were solved using SHELXT (version 2018/2)[S3] program and refined by refined using SHELXL-2014.[S4-S6]. The positions of H-atoms were calculated and refined isotopically. Crystallographic data of **Py-Pr-OH** have been deposited with the Cambridge Crystallographic Data Centre (CCDC) under deposition no 2249837 and the crystallographic parameters are given in Table S1, supporting information.

Table S1. Single crystal X-ray parameters of **Py-Pr-OH** at 298 K

Compound	**Py-Pr-OH**
CCDC deposit No.	2249837
Chemical formula	$C_{25}H_{20}Br\ N\ O$
M_r	430.33
Crystal system	Orthorhombic
Space group	$P2_12_12_1$
a / Å	7.9403(5)
b / Å	9.8325(6)
c / Å	25.0359(16)
a / ° b / ° g / °	90 90 90
V / Å^3	1954.6(2)
Zs	4
ρ_{calc} / (g cm^{-3})	1.462
μ / mm^{-1}	2.118
F_{000}	880
θ_{min} / °	2.22
θ_{max} / °	21.30
Reflections collected	4375
Independent reflections	2934
GoF	1.115
Final R indices [$I > 2\sigma(I)$]	R_1 = 0.0445 wR_2 = 0.949
R indices (all data)	R_2 = 0.0952, wR_2 = 0.1207

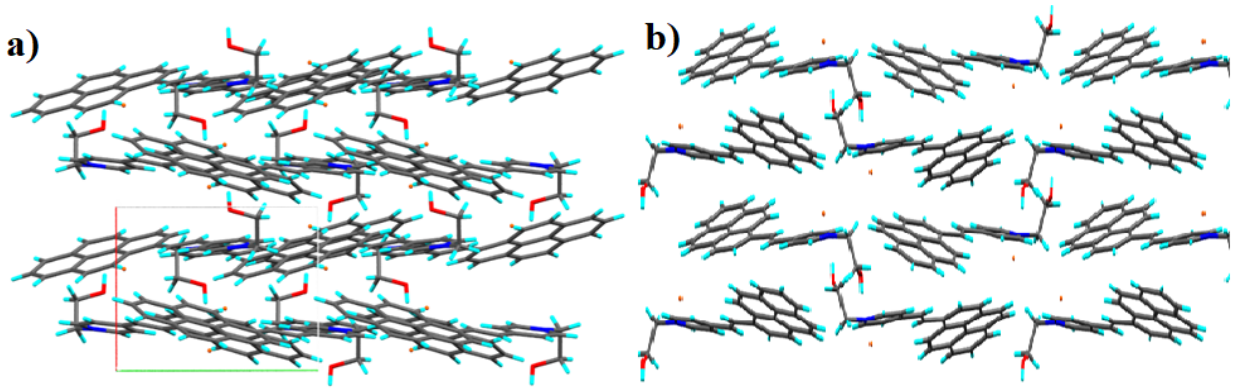

Figure S3. a) Packing of the molecules when viewed along *c*-axis. b) Packing of the molecules when viewed along *b*-axis.

Table S2. Solvent dependent properties of **Py-Pr-OH** in different solvents

Solvent	**Py-Pr-OH** λ_{ex} **(nm)**	**Py-Pr-OH** λ_{ex} **(nm)**	**Py-Pr-OH** ε M^{-1} cm^{-1}
MeOH	450	569	51,000@450 nm
EtOH	456	567	48,000@456 nm
2-Pr-OH	454	567	44,000@454 nm
THF	446	566	20,000@446 nm
ACN	444	569	42,000@444nm
DMF	445	567	40,000@445nm
DMSO	446	568	40,000@446 nm
H_2O	438	571	38,000@438 nm

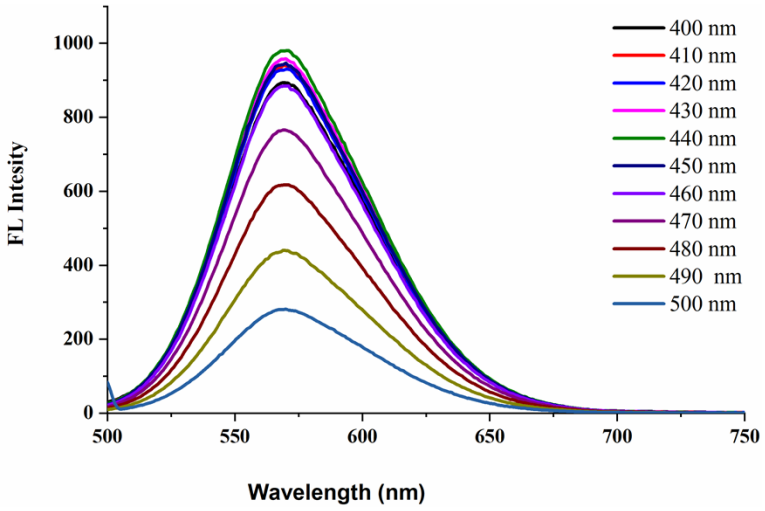

Figure S4. Fluorescence spectra **of Py-Pr-OH** (10 μM) with different excitation wavelengths at room temperature in methanol.

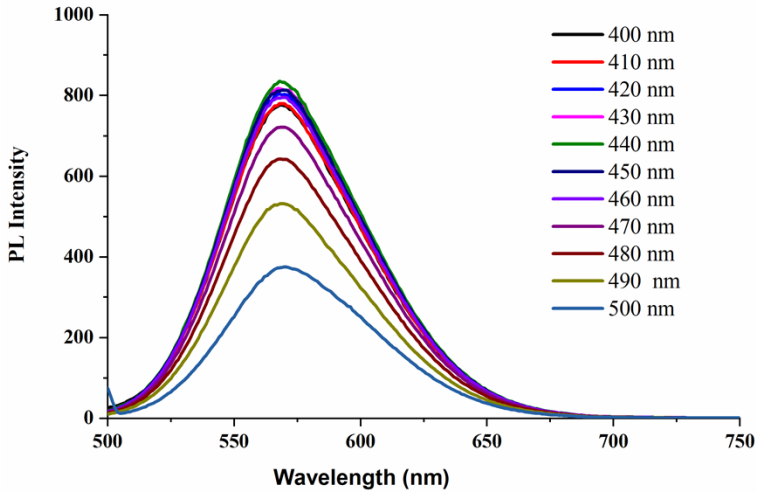

Figure S5. Fluorescence spectra **of Py-Pr-OH** (10 μM) with different excitation wavelengths at room temperature in ethanol.

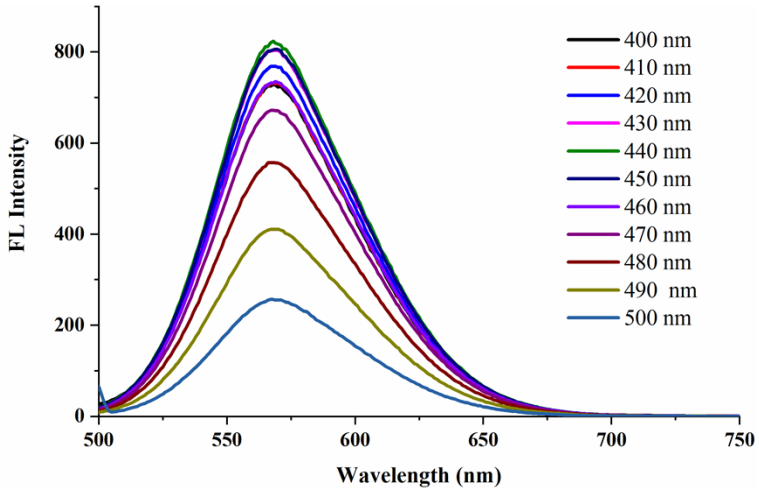

Figure S6. Fluorescence spectra **of Py-Pr-OH** (10 μM) with different excitation wavelengths at room temperature in 2-Propanol.

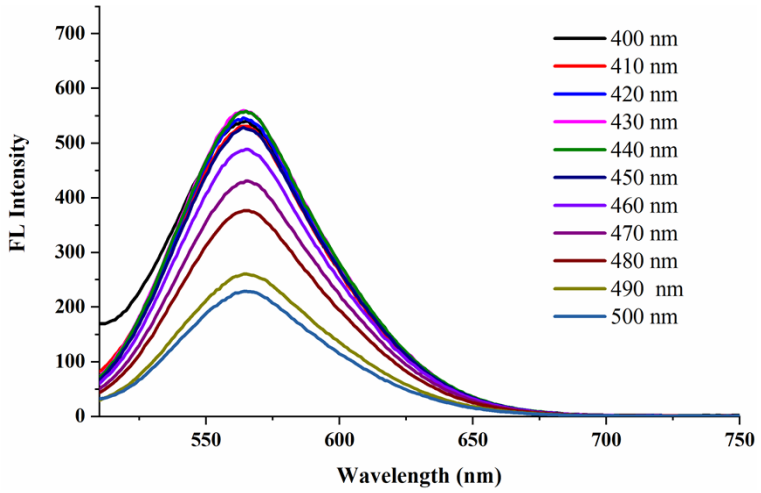

Figure S7. Fluorescence spectra **of Py-Pr-OH** (10 μM) with different excitation wavelengths at room temperature in THF.

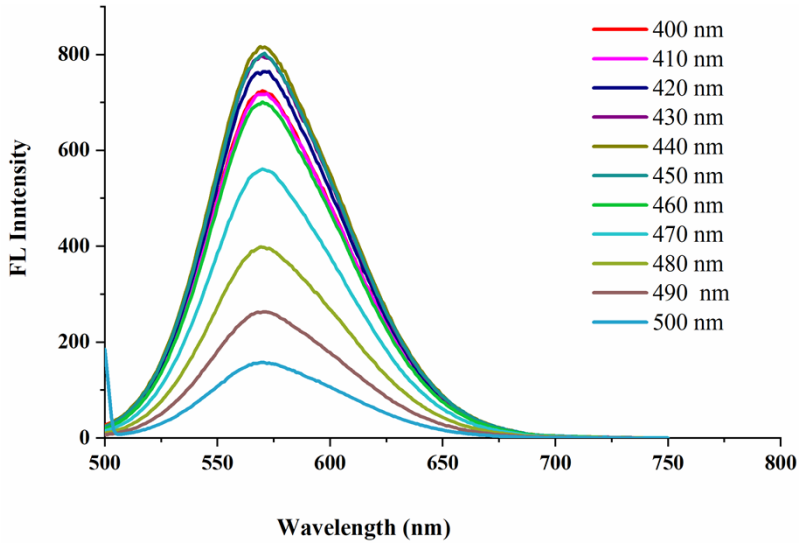

Figure S8. Fluorescence spectra **of Py-Pr-OH** (10 μM) with different excitation wavelengths at room temperature in acetonitrile.

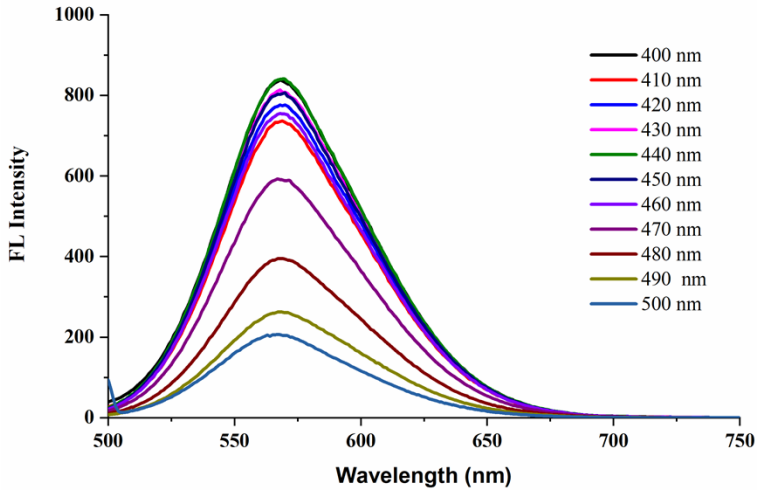

Figure S9. Fluorescence spectra **of Py-Pr-OH** (10 μM) with different excitation wavelengths at room temperature in DMF.

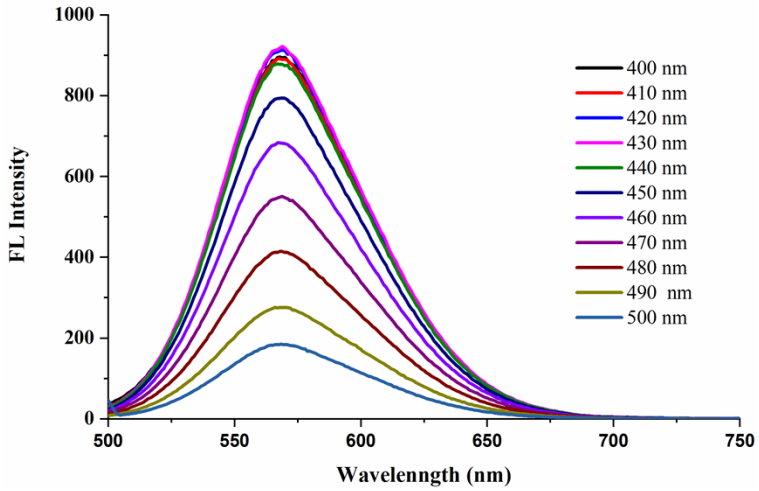

Figure S10. Fluorescence spectra **of Py-Pr-OH** (10 μM) with different excitation wavelengths at room temperature in DMSO.

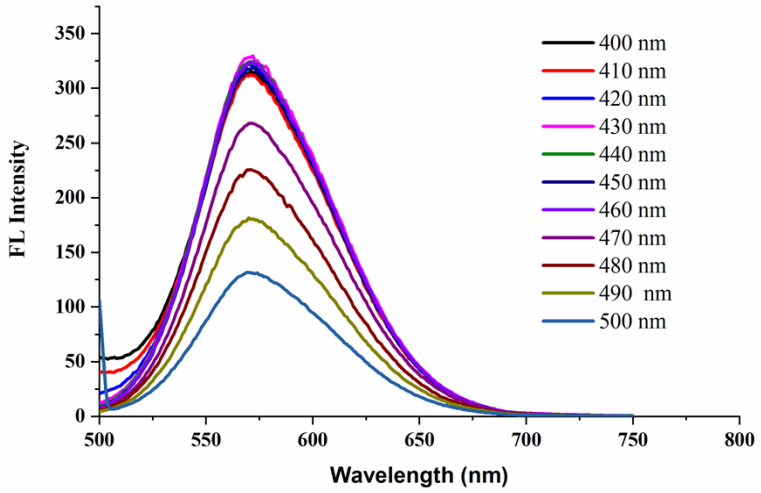

Figure S11. Fluorescence spectra **of Py-Pr-OH** (10 μM) with different excitation wavelengths at room temperature in water.

Quantum yield calculation

$\Phi_S = \Phi_R \, I_S/I_R * A_R/A_S$

Φ_S – Quantum yield of sample; Φ_S – Quantum yield of reference (Fluorescein = 0.79)

I_S – Integrated fluorescent area of sample; I_R – Integrated fluorescent area of sample.

A_R – Absorbance of reference; A_S – Absorbance of sample

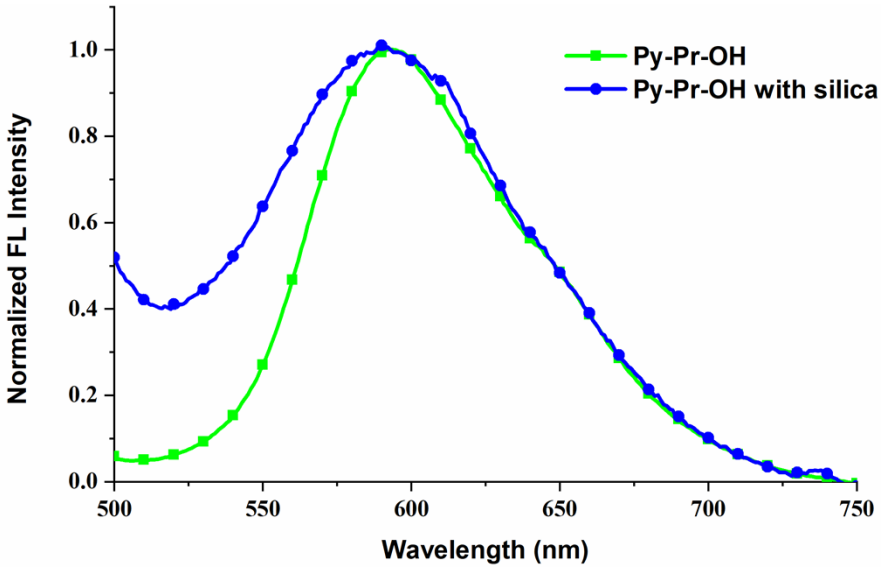

Figure S12. Normalized solid state emission spectra of **Py-Pr-OH** and **Py-Pyr-OH** with silica.

LFM development Powder preparation procedure

To the suspension of **Py-Pr-OH** in DCM, silica gel (230-400 mesh) was added. The solvent was evaporated in rotary evaporator. The silica adsorbed material was further grinded to make it free flow, and was further used for LFMs development procedure.

LFM development procedure by powder dusting method

FMs were collected from volunteers, asked to touch their fingers lightly on the chosen substrate surfaces such as tinfoil, paper currency, ceramic tile, plastic, plywood, CD, coin etc.). The LFM developing fluorescent smoothly brushed on their surfaces the images were captured using mobile phone camera.

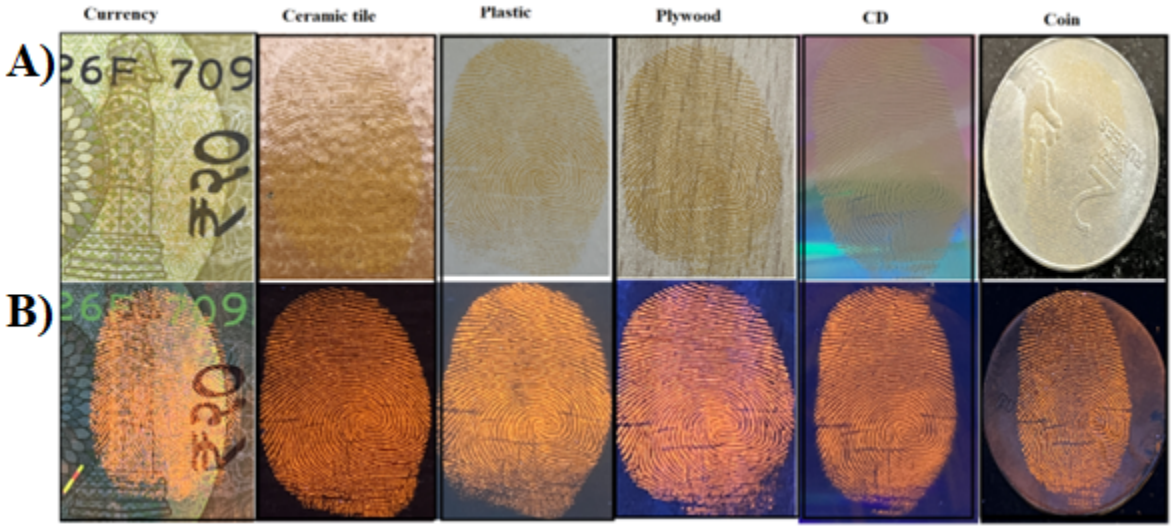

Figure S13. LFM developed on various non-porous substrates such as currency, ceramic tile, plastic, plywood, CD, coin A) under daylight, B) under UV light.

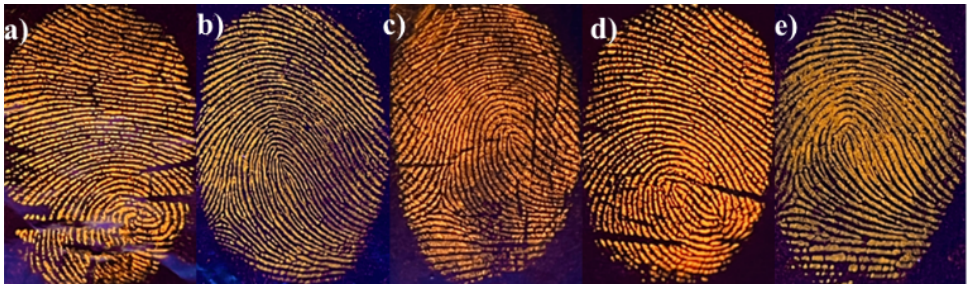

Figure S14. LFM developed on aluminium foil of different volunteers a) volunteer 1; b) volunteer 2; c) volunteer 3; d) volunteer 4; e) volunteer 5.

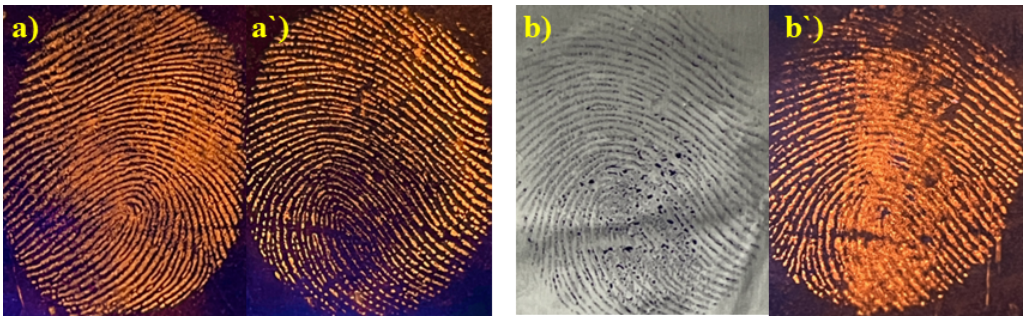

Figure S15. LFM developed on aluminium foil for aged sample a) after 7 days a') after 15 days in ambient atmosphere and Stained sample b) before treatment; b') After treatment with **Py-Pr-OH**.

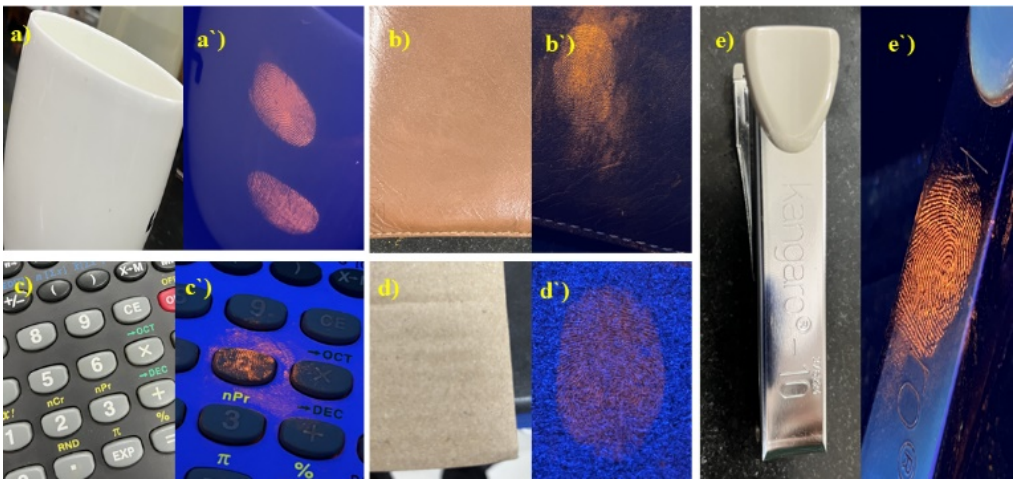

Figure S16. LFM developed on surfaces of common objects like a) coffee mug b) leather wallet c) calculator d) cardboard e) stapler under under day light a') coffee mug b') leather wallet c') calculator d') cardboard e') stapler under 365 nm UV light.

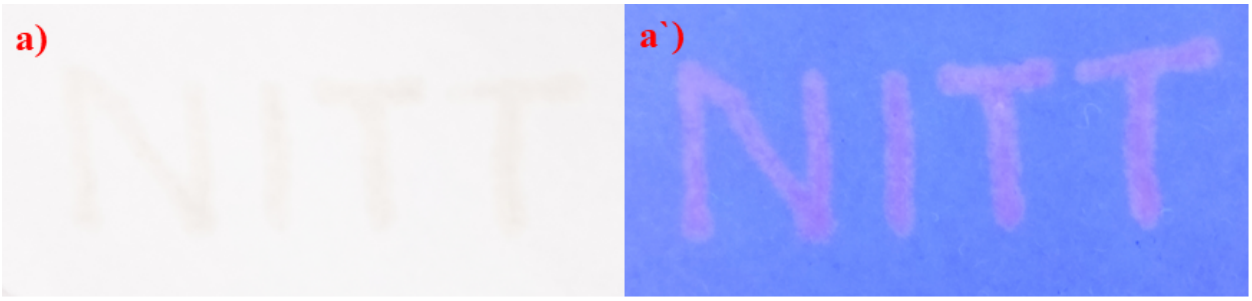

Figure S17. Anticounterfeiting labeling using **Py-Pr-OH a)** under natural light a') UV light (365nm)

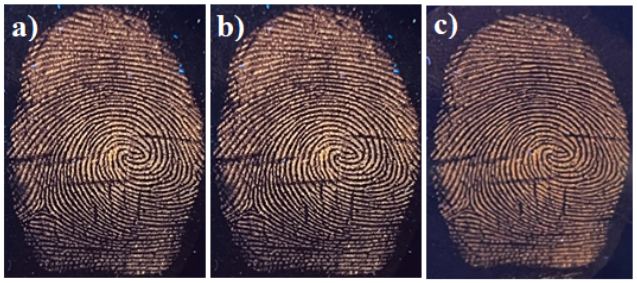

Figure S18. Fluorescence image of LFP developed using **Py-OH** after a) 7 days; b) 14 days; c) 30 days of ageing.

References:

S1. APEX3, version 2017.3-0, and SAINT, version 8.38A, Bruker AXS Inc., Madison, WI, 2012, URL: https://www.bruker.com

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