

## Supplementary Information

### **Development of Graphitic-N-based Carbon Dots Using Solid-state Synthesis for Fingerprinting, LEDs, and Anticounterfeiting.**

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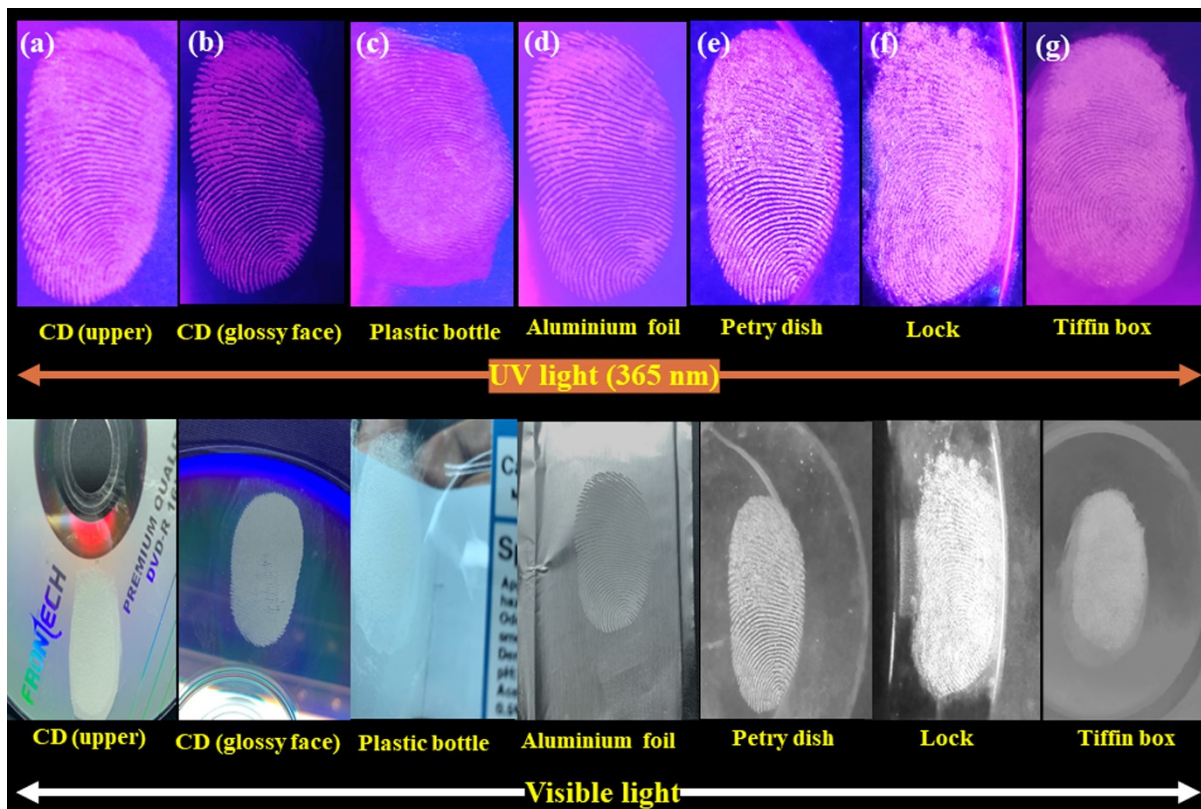
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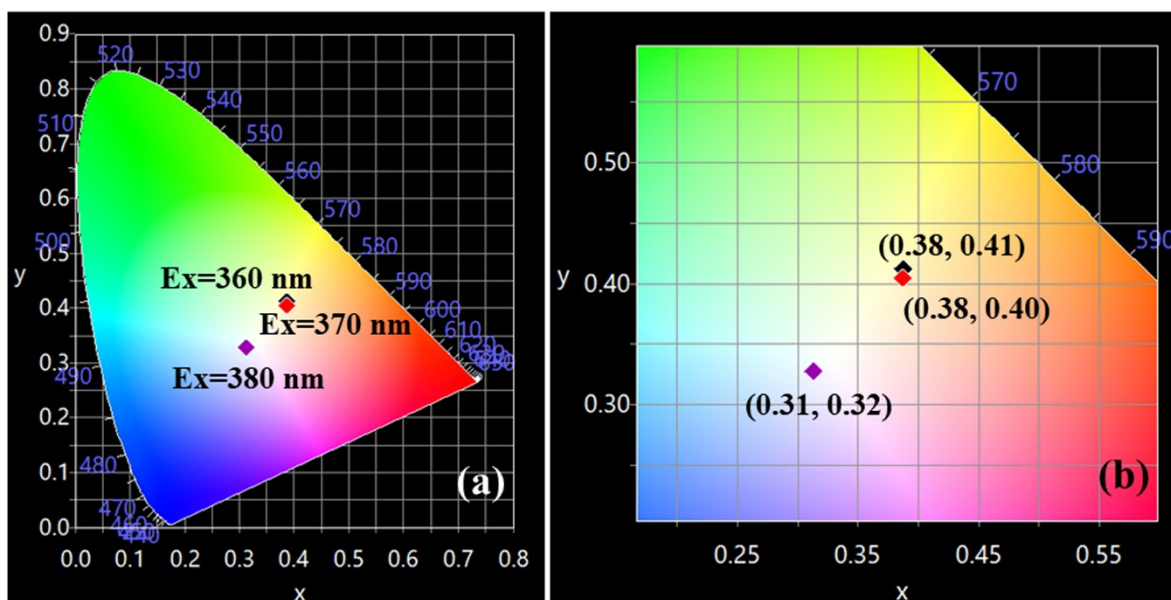
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**Fig. S1** The latent fingerprints (LFPs) developed on different substrates like on (a) compact disc upper face (b) compact disc glossy face (c) plastic solvent bottle (d) foil made of aluminium (e) petri dish made of glass (f) lock, and (g) tiffin box in daylight (visible light) as well as UV irradiation (365 nm).



**Fig. S2** (a) CIE Coordinates of RP-CDs at different excitation wavelengths and (b) CIE Enlarged image of RP-CDs

**Table S1.** LED parameters of RP-CDs-based LED at different currents.

<b>Excitation</b>	<b>CIE</b>	<b>CRI</b>	<b>CCT</b>
<b>360 nm</b>	0.3875, 0.4126	59	4061
<b>370 nm</b>	0.3874, 0.4046	61	4014
<b>380 nm</b>	0.3133, 0.3276	81	6481

**Table S2.** LED parameters of RP-CDs at different excitations

<b>CIE</b>	<b>CRI</b>	<b>CCT</b>	<b>Current</b>
<b>0.4675, 0.4114</b>	<b>91</b>	<b>2603</b>	<b>700 mA</b>
<b>0.4137, 0.3898</b>	<b>96</b>	<b>3313</b>	<b>600 mA</b>
<b>0.4140, 0.3862</b>	<b>97</b>	<b>3277</b>	<b>500 mA</b>
<b>0.4056, 0.3778</b>	<b>98</b>	<b>3383</b>	<b>400 mA</b>

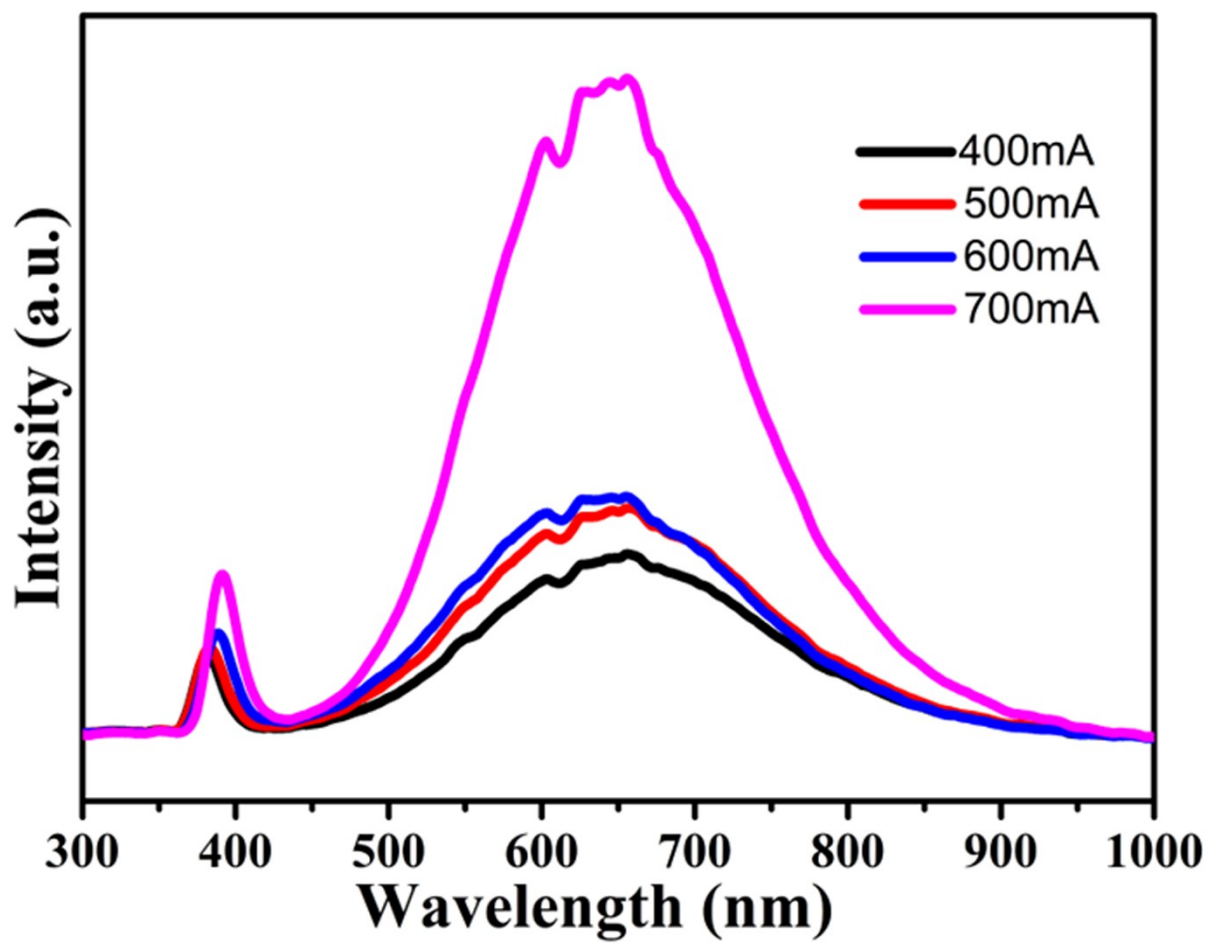
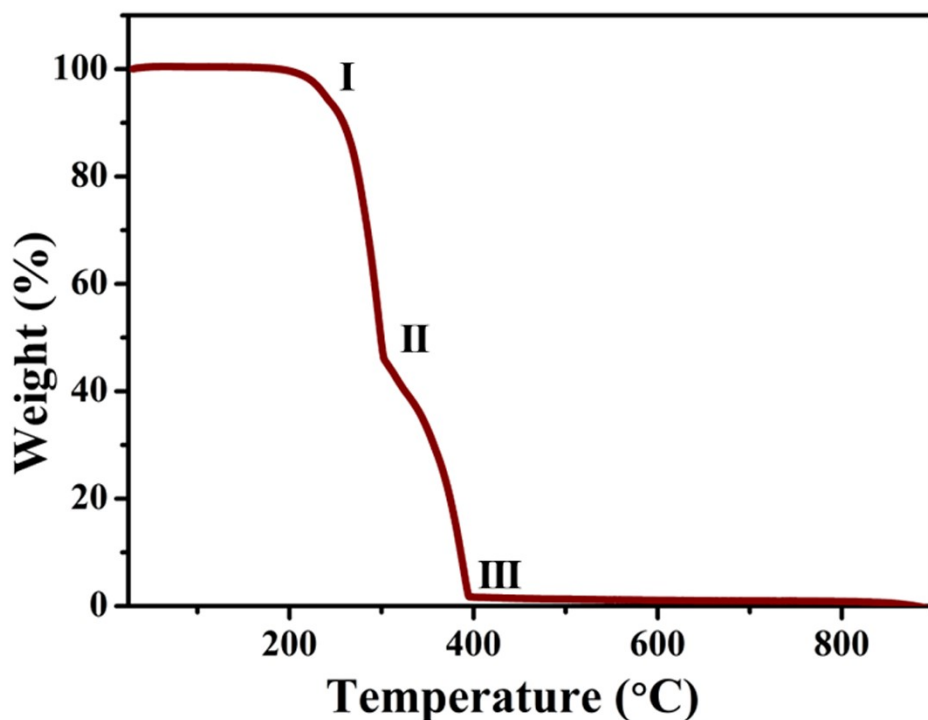


Fig. S3 PL Emission spectrum of RP-CDs-based LED at different currents.



**Fig. S4** Thermal gravimetric analysis of RP-CDs.

TGA analysis was performed to analyze the thermal stability of the carbon dots. RP-CDs were completely dried in a vacuum oven at 100 °C for 72 h before doing thermal gravimetric analysis. The TGA curve of RP-CDs is shown in Fig. S4, and the temperature of 230 °C (about 55% weight loss) that happens may be related to the degradation of the carbonyl group (C=O) present in the carbon dots. The imine group (C=N) was responsible for the second weight loss at 306 °C (approx. 45%) and the third curve depicts the total degradation of CDs at 395 °C.

**Table S3.** The comparative table between previously reported carbon dots with the type of surfaces (where latent fingerprints were taken), fluorescence emission, precursor, and synthesis methods.

Precursors	Synthesis methods	Fluorescence	Type of surface (where LFPs detected)	References
Luminol & coconut water	Hydrothermal method	Blue	Glass, coins, plastics,	[1]
Resorcinol and phloroglucin	Microwave synthesis	Blue and Orange	Foam	[2]
p-phenylenediamine and phosphorus acid.	Hydrothermal method	Red	Glass sheets, aluminum foil, leather, and plastic pieces	[3]
Phloroglucinol and boric acid	Solid state reaction	Red	Metal foil, Plastic sheet	[4]
Phthalic acid and piperazine	Microwave synthesis	Yellow-green	Glass, tinfoil, plastics and weighing paper	[5]
Tartaric acid and triethylene tetramine	Hydrothermal process	Green	Glass slides, tiles, leather, aluminum foil, printing paper, colored surfaces of plastic packing, copper foil, planks, leaves, currencies, and bar codes	[6]
Sodium citrate and urea	Solvothermal method.	Blue	Silicon pieces	[7]
Pyromellitic acid and urea	Solid-state synthesis	Red	Compact disc upper face, compact disc glossy face, plastic solvent bottle, aluminium foil, petri dish (glass), lock (steel), and the tiffin box.	[This work]

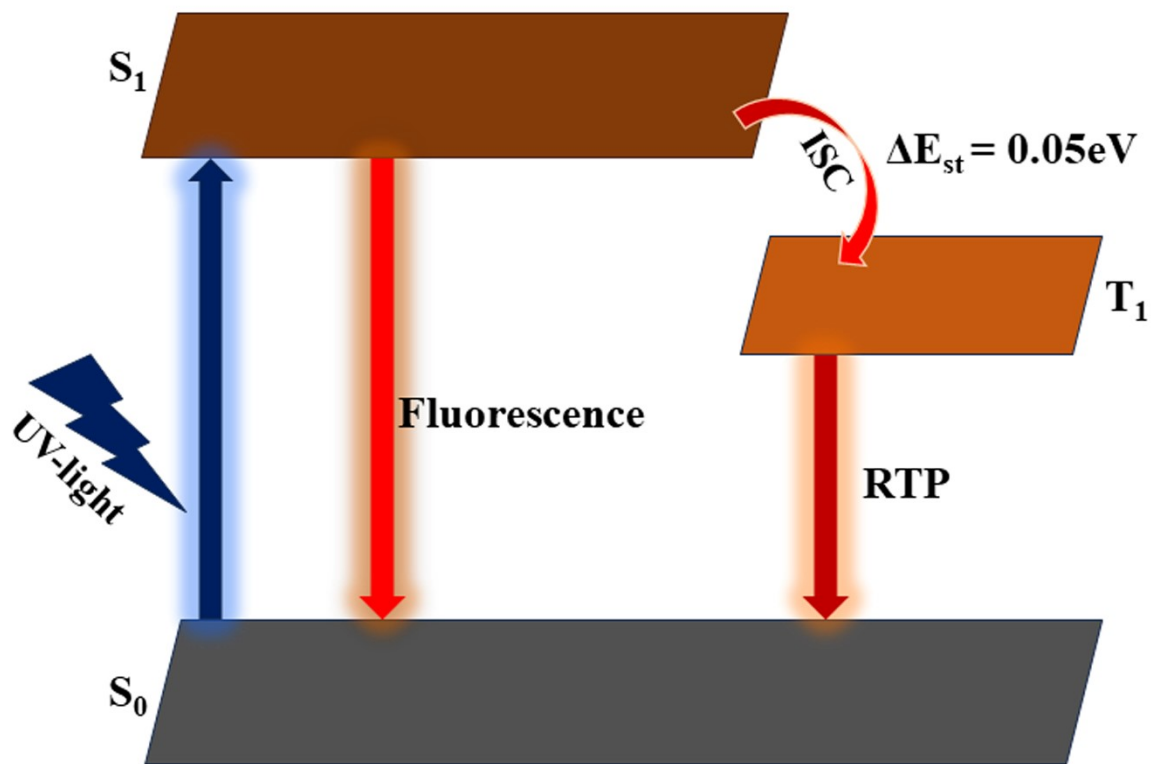


Fig. S5 The energy level diagram of RP-CDs.



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