# High-Resolution Array Devices via Insulating Pattern Definition Layer Transferred by UV-Adhesive Stamp

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**Supporting Information**

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**Captions**

**Figure S1** Swelling phenomenon observed after spin-coating PMMA in chlorobenzene solvent on a PDMS substrate.

**Figure S2 (a)** AFM measurement result of the cylindrical height of the UV-adhesive stamp; **(b)** AFM-measured pore depth of the microporous film prepared from 10 mg/mL PMMA and filled with HIL; **(c)** 2D and 3D topographic images of PMMA microporous films prepared by rigid substrate stamps; **(d)** 2D and 3D topographic images of PMMA microporous films prepared by flexible substrate stamps.

**Figure S3 (a-b)** Measurement of Young's modulus on the PDMS surface; **(c-d)** Plot of the discrete distribution of Young's modulus within a local area on the PDMS surface.

**Figure S4 (a)** Schematic illustration of pressure distribution in the rigid-soft composite stamp during the pattern transfer process; **(b)** Schematic illustration of pressure distribution in a stamp with a thick flexible substrate during the pattern transfer process.

**Figure S5 (a)** SEM images of a PMMA microporous film from a low-magnification overview to progressively higher magnifications; **(b)** Photoluminescence images of the microporous structures infused with quantum dots from a low-magnification overview to progressively higher magnifications; **(c)** Measurement of the actual effective area of the transferred PMMA microporous film.

**Figure S6 (a)** Optical microscopy image of the uniform filling and light emission of quantum dots within the micropores; **(b)** Microscopic measurement results of pixel

size.

**Figure S7** Pixel count on a 25.4 μm diagonal line, representing approximately 1/1000 of the pixel count per inch.

**Figure S8 (a)** and **(b)** Wetting behavior of PEDOT: PSS on the PMMA surface before and after hydrophilic treatment.

**Figure S9 (a)** Schematic diagram of the high-resolution device structure and the internal structure of the microporous film; **(b)** Energy band diagrams of the blocking and emissive regions, and a schematic illustration of the electron-hole recombination mechanism.

**Figure S10 (a)** Circuit schematic of the high-resolution device without an insulating layer, showing leakage paths; **(b)** Circuit schematic illustrating the blocking effect of the insulating layer between pixels.

**Figure S11 (a)** Comparison of fluorescence spectra between patterned and non-patterned devices; **(b)** Comparison of fluorescence lifetime between patterned and non-patterned devices; **(c)** Plot of the chromaticity coordinates for a set of high-resolution devices; **(d)** Electroluminescence spectra of the high-resolution device at applied voltages from 4 V to 8 V.

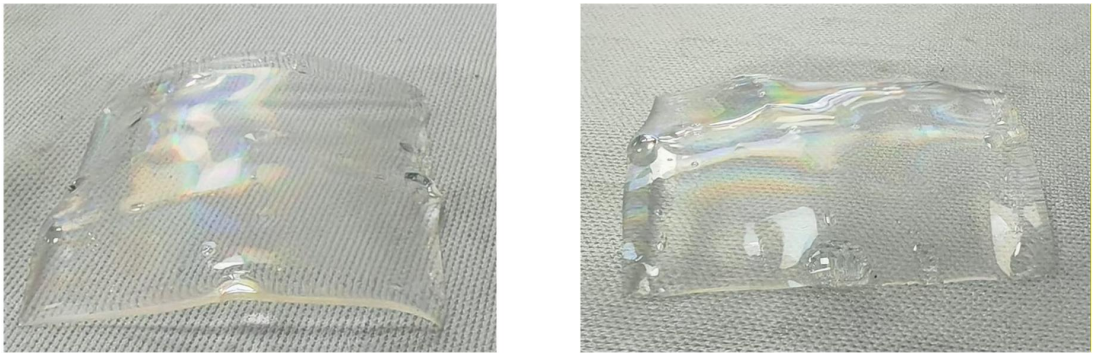

**Figure S1**

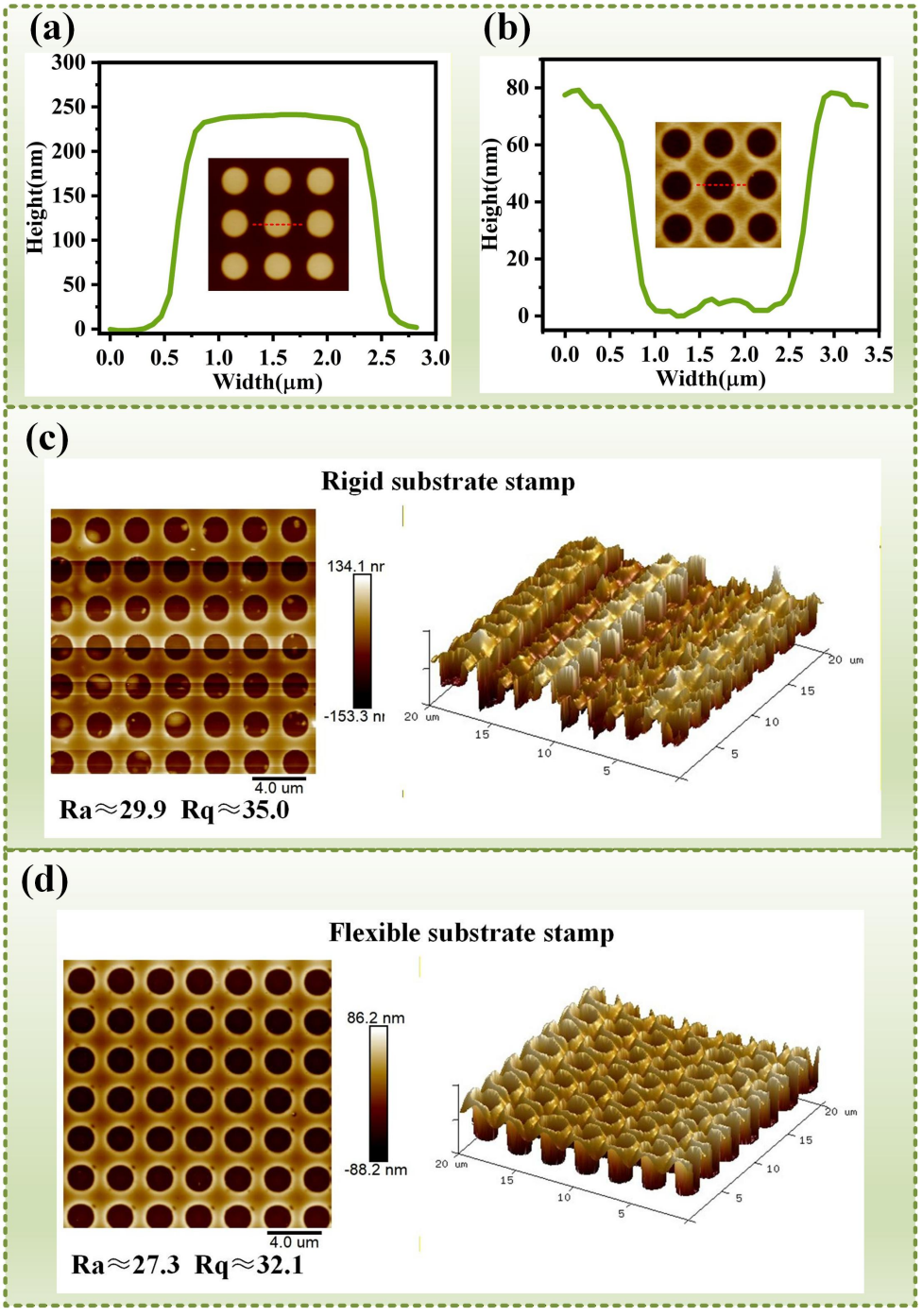
(a)
Height(nm)
Width(μm)
(b)
Height(nm)
Width(μm)
(c)
Rigid substrate stamp
134.1 nr
-153.3 nr
4.0 um
Ra≈29.9 Rq≈35.0
(d)
Flexible substrate stamp
86.2 nm
-88.2 nm
4.0 um
Ra≈27.3 Rq≈32.1

**Figure S2**

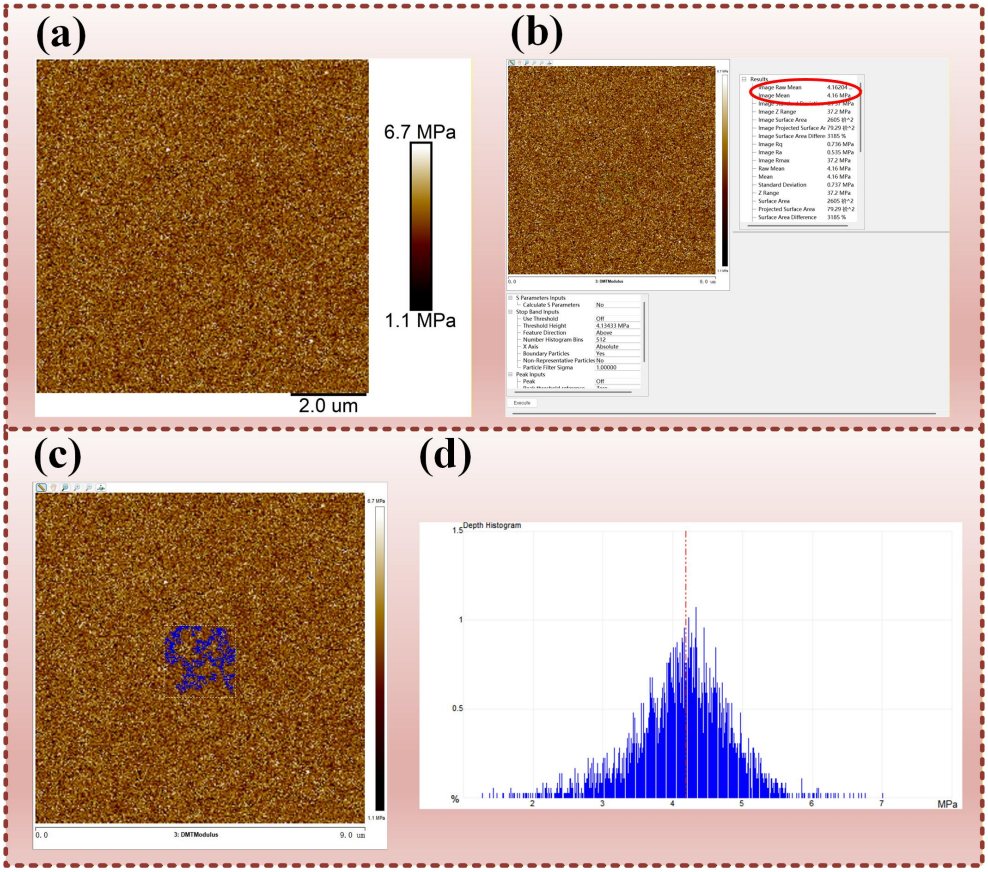


**Figure S3**

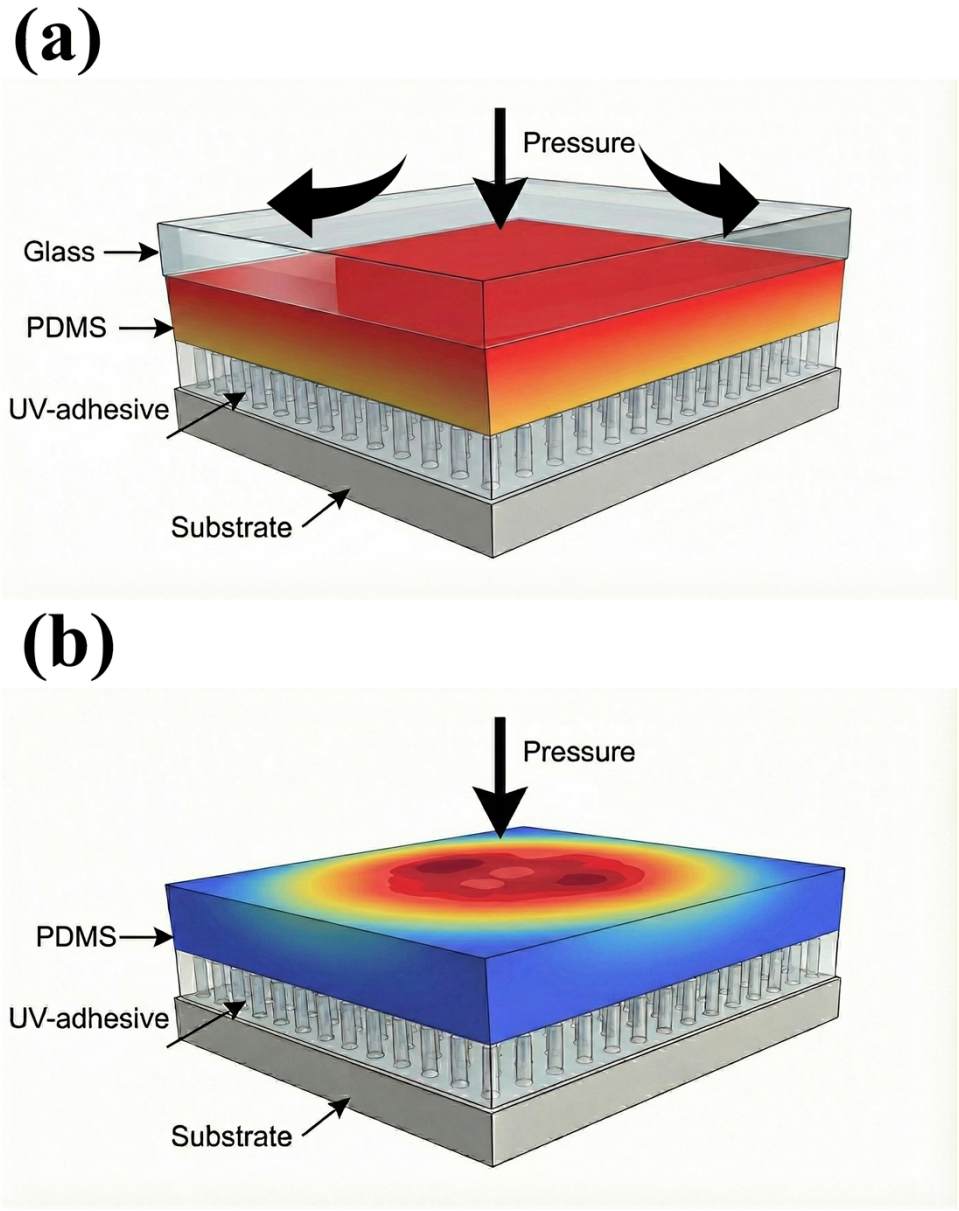
(a)
Pressure
Glass
PDMS
UV-adhesive
Substrate
(b)
Pressure
PDMS
UV-adhesive
Substrate

**Figure S4**

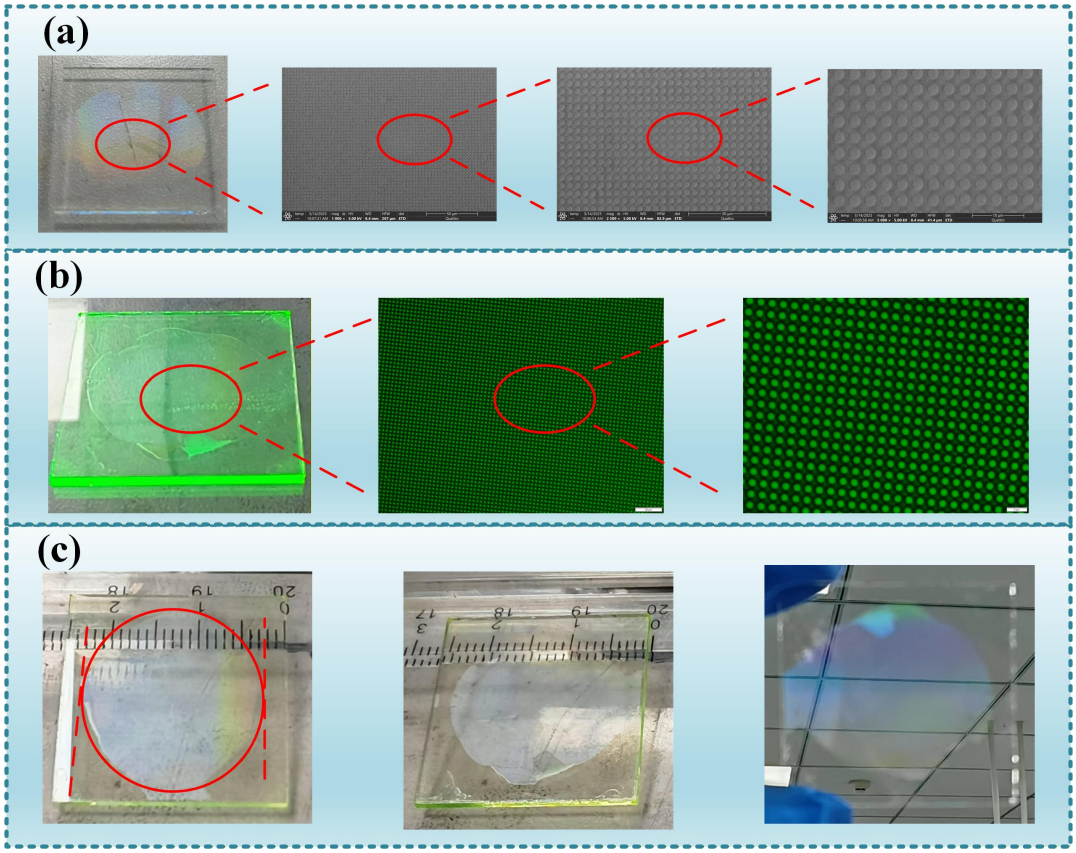


**Figure S5**

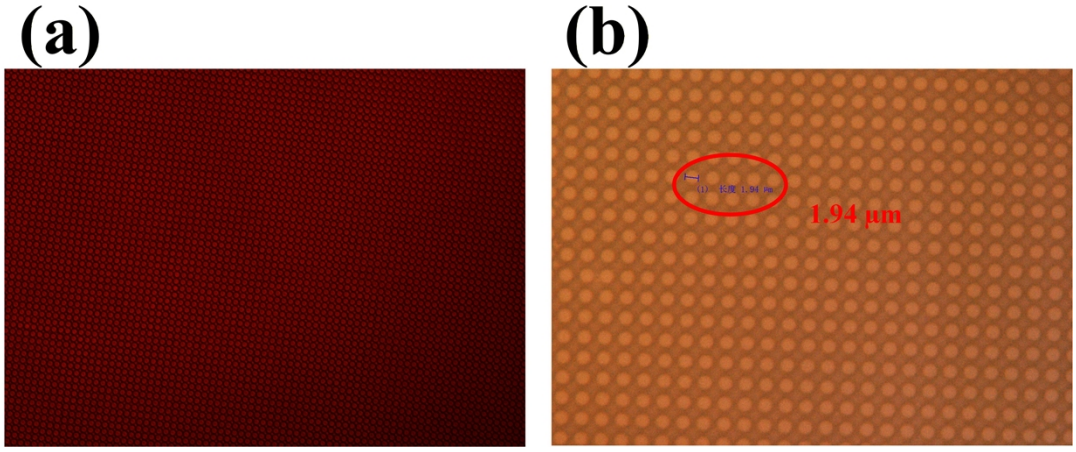


**Figure S6**

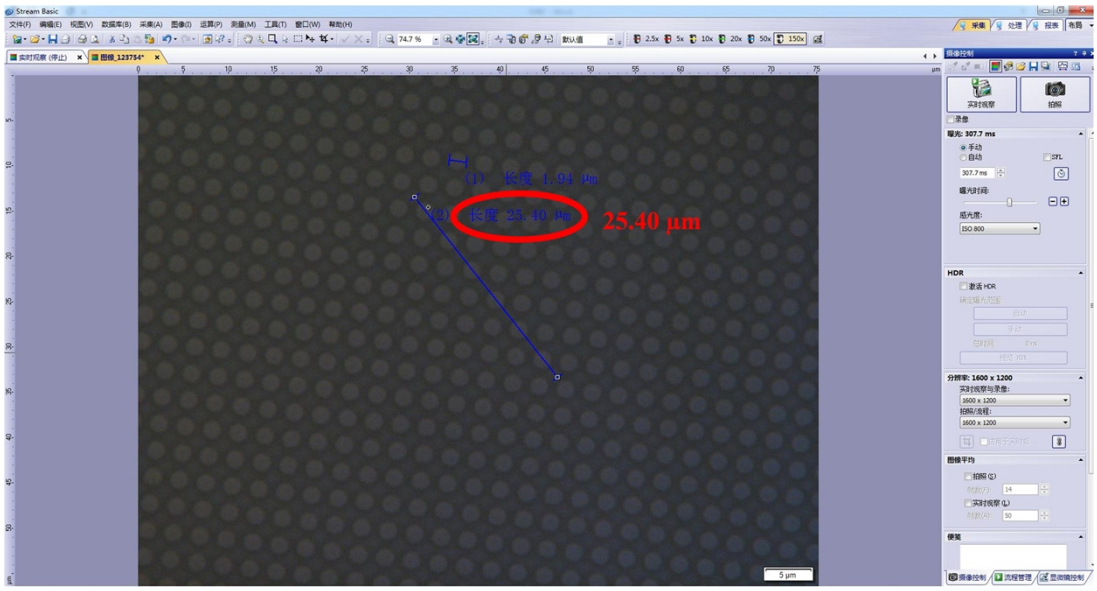


**Figure S7**

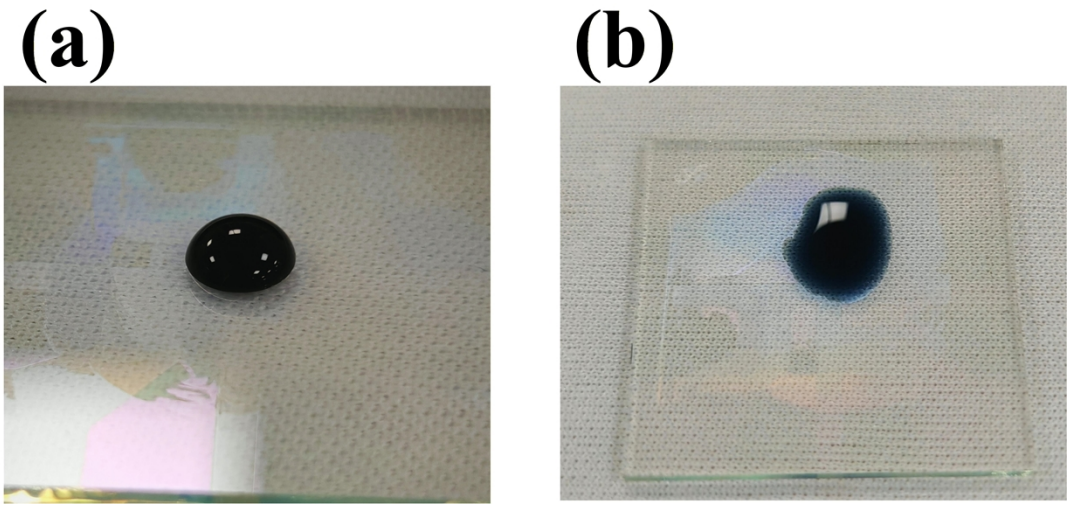


**Figure S8**

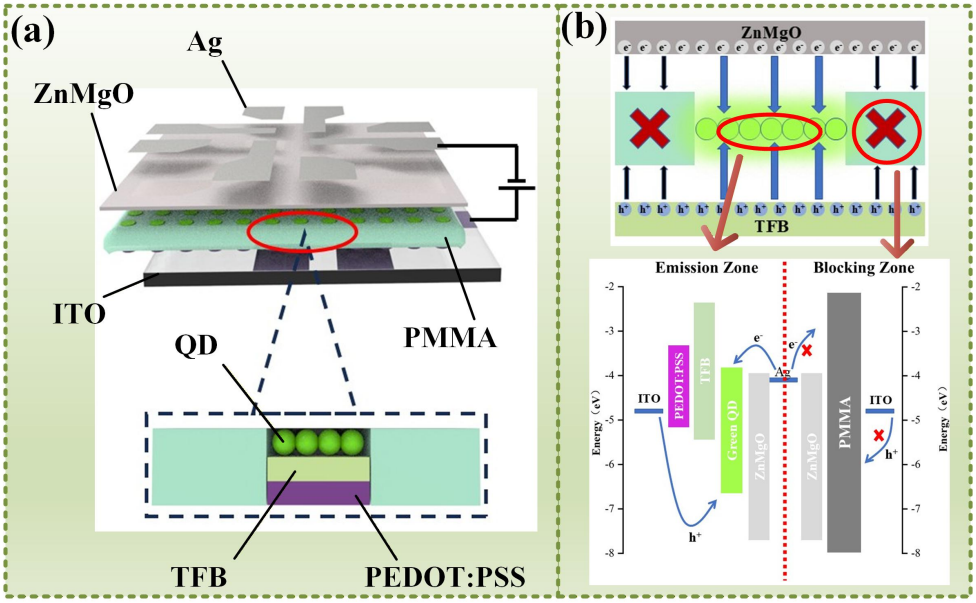
(a)
Ag
ZnMgO
ITO
QD
PMMA
TFB
PEDOT:PSS
(b)
ZnMgO
TFB
Emission Zone
Blocking Zone
ITO
PEDOT:PSS
TFB
Green QD
ZnMgO
Ag
ZnMgO
PMMA
ITO
Energy (eV)
-2
-3
-4
-5
-6
-7
-8

**Figure S9**

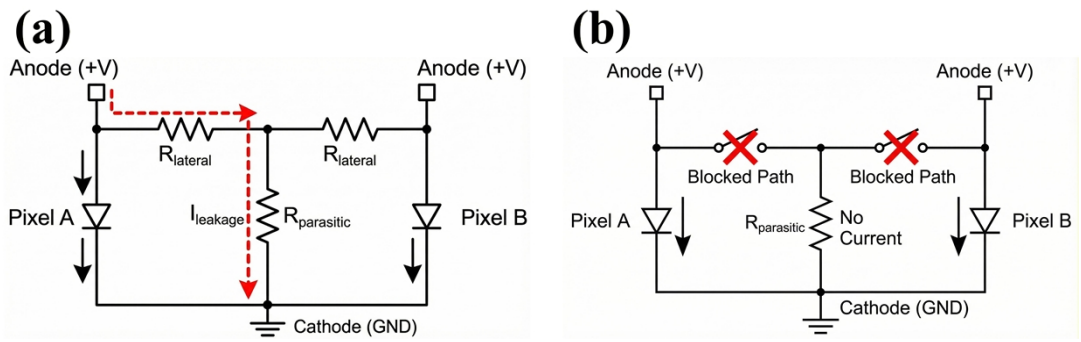
(a)
Anode (+V)
Anode (+V)
R lateral
R lateral
Pixel A
I leakage
R parasitic
Pixel B
Cathode (GND)
(b)
Anode (+V)
Anode (+V)
Blocked Path
Blocked Path
Pixel A
R parasitic
No
Current
Pixel B
Cathode (GND)

**Figure S10**

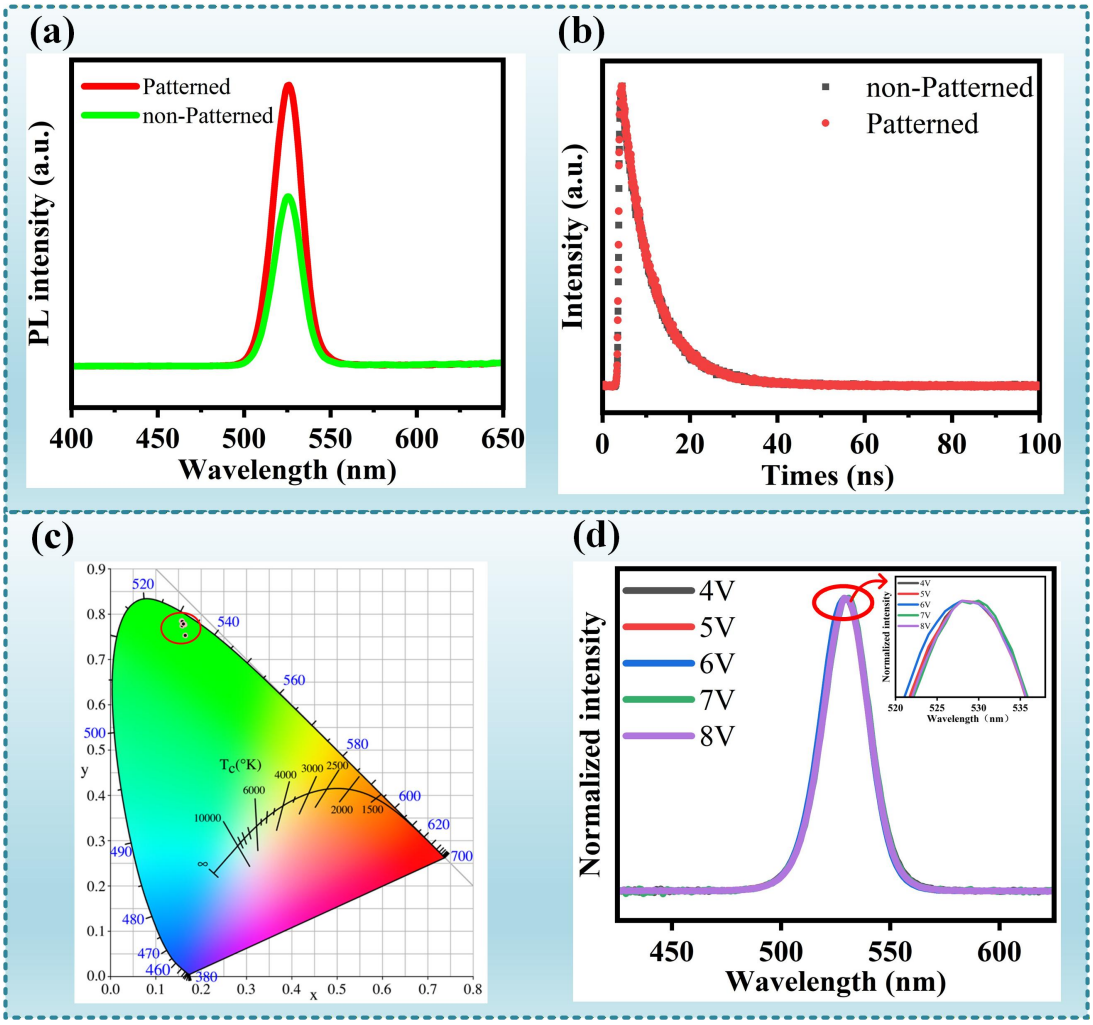
(a)
Patterned
non-Patterned
PL intensity (a.u.)
400
450
500
550
600
650
Wavelength (nm)
(b)
non-Patterned
Patterned
Intensity (a.u.)
0
20
40
60
80
100
Times (ns)
(c)
520
540
560
580
600
620
700
490
480
470
460
380
500
$T_c$(°K)
10000
6000
4000
3000
2500
2000
1500
∞
y
x
(d)
4V
5V
6V
7V
8V
Normalized intensity
Wavelength (nm)
450
500
550
600

**Figure S11**