Dual-benefit strategy for developing an efficient photodetector with prompt response to UV-near IR radiations: *in situ* synthesis and crystallization through a simple one-step annealing

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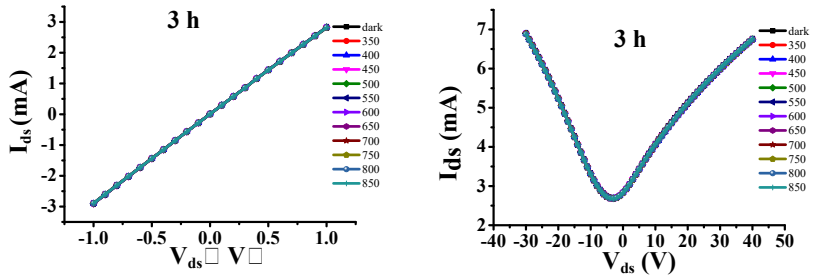
Figure S1

a) b)



c) d)

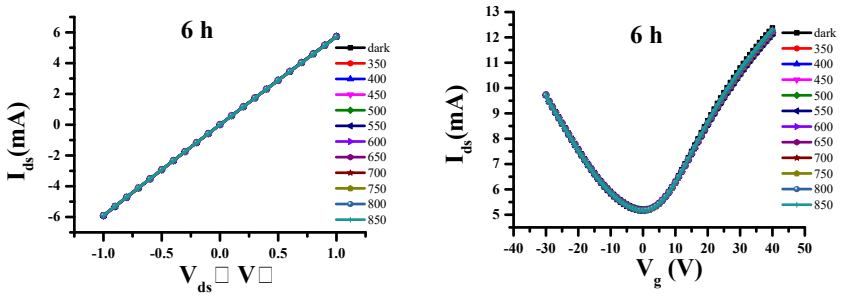


Figure S1 Typical I_{ds}-V_{ds} (V_g=0 V) and I_{ds}-V_g curves (V_{ds}=1 V) of 3 h (a and b) and 6 h (c and d) C8-DPP-BP/G phototransisitors in dark and upon radiations. Incident power density (P_{in}) of radiations in (a-d) : P_{in} (350 nm)= 0.48 mW cm^{-2}, P_{in} (400 nm)= 0.63 mW cm^{-2}, P_{in} (450 nm)= 0.7 mW cm^{-2}, P_{in} (500 nm)= 0.68 mW cm^{-2}, P_{in} (550 nm)= 0.51 mW cm^{-2}, P_{in} (600 nm)= 0.37 mW cm^{-2}, P_{in} (650 nm)= 0.26 mW cm^{-2}, P_{in} (700 nm)= 0.19 mW cm^{-2}, P_{in} (750 nm)= 0.14 mW cm^{-2}, P_{in} (800 nm)= 0.1 mW cm^{-2}, P_{in} (850 nm)= 0.08 mW cm^{-2}.

Table S1 R and D* values in part of current researches and this work

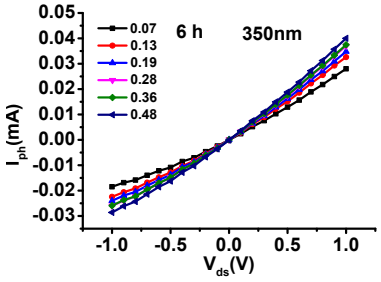
Materials	R (A W^{-1})	D* (Jones)	Wavelength, Power or power density
6 h C8-DPP-BP/G (this work)	100-350	1-3*10^{11}	350-850 nm, 0.08-0.7 mW cm^{-2}
G/h-BN/PTCDI-C13/G[1]	180	10^{10}	550 nm, 13.7 mW cm^{-2}
PTCDI-C8/G[2]	~0.1[a]	~$10^{10, a}$	480 nm, 0.001 mW
G/C_{60}/pentacene[3]	~100-1000	-	405-1550 nm, 1-0.1 mW cm^{-2}
Perovskite/G[4]	~100[a]	~$10^{9, a}$	520 nm, 0.001 mW
G/rhodamine 6G film/G[5]	500	-	520 nm, 0.1 mW
C_{60}/G[6]	~100-1000[a]	-	360-808 nm, 100 nW
Thieno[3,4-b]thiophene/benzodithiophene/G[7]	~100-1000[a]	-	White-light emitting diodes, 1-0.1 mW cm^{-2}
C_{60}/Zn phthalocyanine/G[8]	~10-1000[a]	-	650 nm, 1-0.1 mW cm^{-2}
2,6-diphenyl anthracene/G[9]	~10-100[b]	10^{13}	Xenon lamp, 0.62 mW cm^{-2}

a: Estimated from the R (D*)-power or power density curves

b: Estimated from the R-V_g curve

Figure S2

a)



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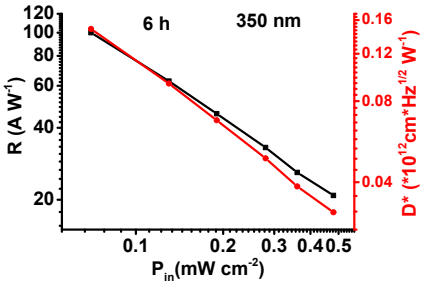
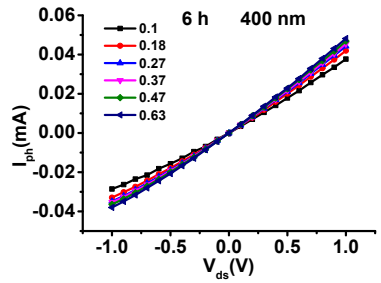


c)



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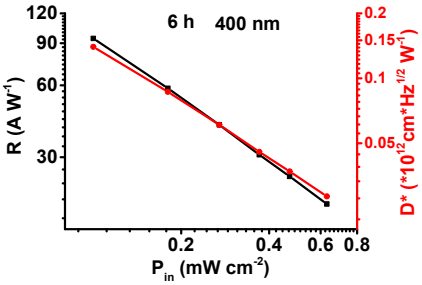
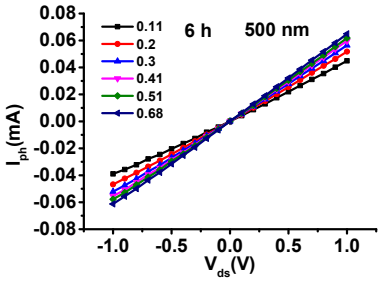
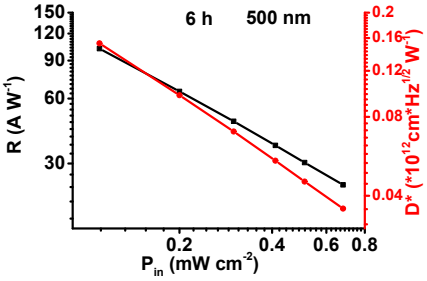


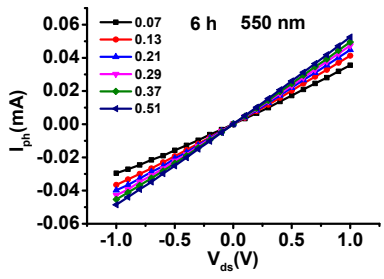
e)



f)



g)



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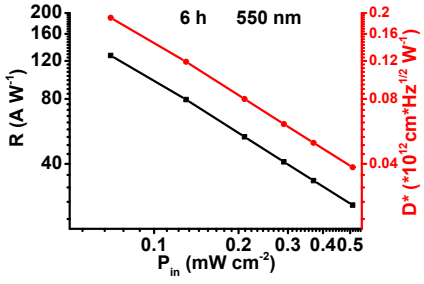
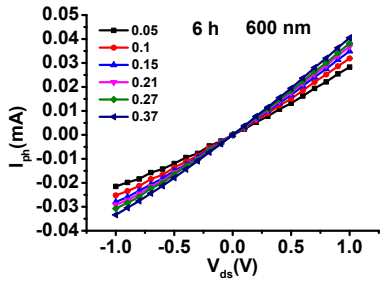
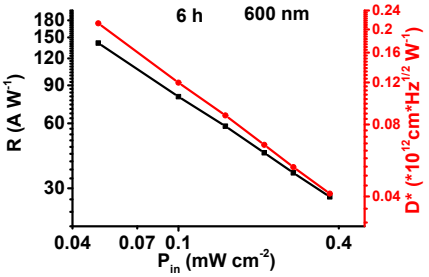


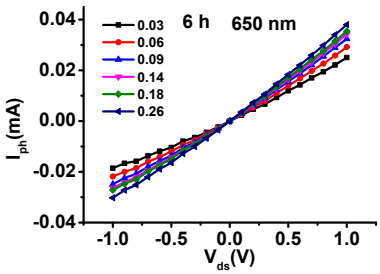
i)


6 h 600 nm
0.05
0.1
0.15
0.21
0.27
0.37
I_{ph}(mA)
V_{ds}(V)

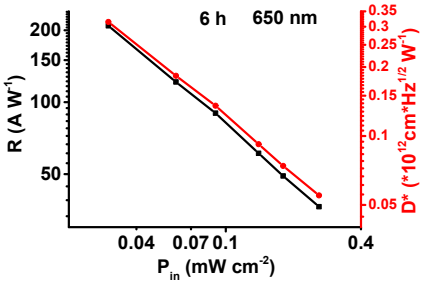
j)


6 h 600 nm
R (A W^{-1})
D* (*10^{12}cm*Hz$^{1/2}$ W^{-1})
P_{in} (mW cm^{-2})

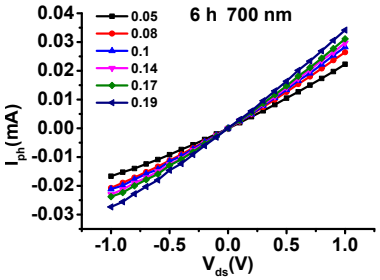
k)


6 h 650 nm
0.03
0.06
0.09
0.14
0.18
0.26
I_{ph}(mA)
V_{ds}(V)

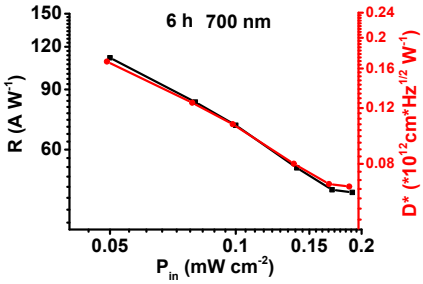
l)


6 h 650 nm
R (A W^{-1})
D* (*10^{12}cm*Hz$^{1/2}$ W^{-1})
P_{in} (mW cm^{-2})

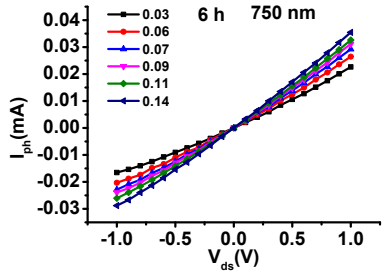
m)


6 h 700 nm
0.05
0.08
0.1
0.14
0.17
0.19
I_{ph}(mA)
V_{ds}(V)

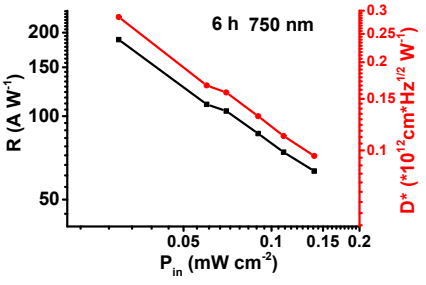
n)


6 h 700 nm
R (A W^{-1})
D* (*10^{12}cm*Hz$^{1/2}$ W^{-1})
P_{in} (mW cm^{-2})

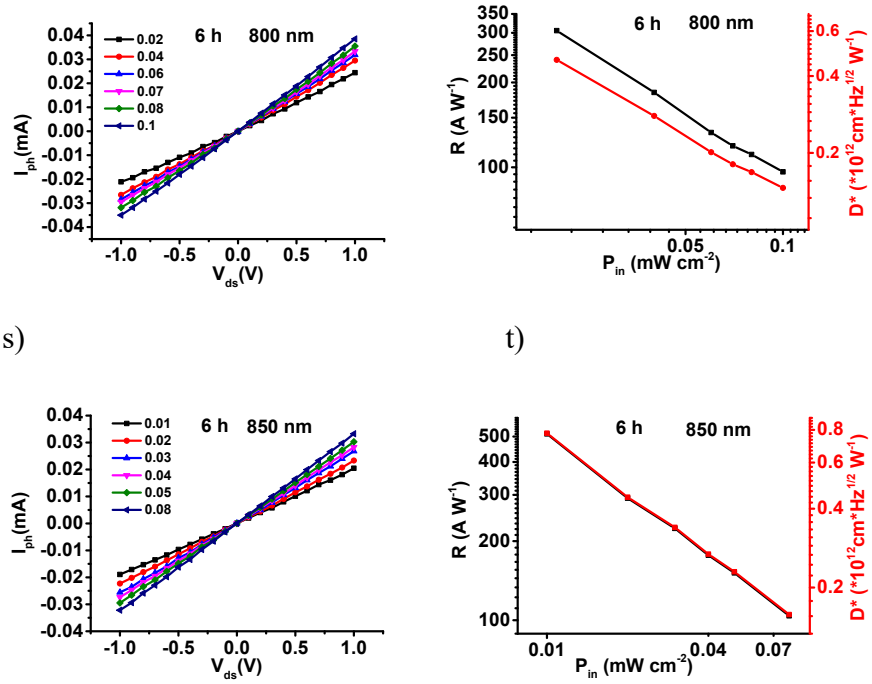
o)


6 h 750 nm
0.03
0.06
0.07
0.09
0.11
0.14
I_{ph}(mA)
V_{ds}(V)

p)


6 h 750 nm
R (A W^{-1})
D* (*10^{12}cm*Hz$^{1/2}$ W^{-1})
P_{in} (mW cm^{-2})

q) r)



s) t)

Figure S2 Typical I_{ph}-V_{ds} curves at different P_{in} (mW cm^{-2}, V_g=0 V) and R/D*- P_{in} lines (bilogarithmical scales, V_{ds}=1 V, V_g=0 V) of 6 h C8-DPP-BP/G phototransisitors.

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