Electronic Supplementary Material (ESI) for RSC Advances.

Porous Organic Polymer Nanosphere-Based Fluorescent Biosensing Platform for Simultaneous Detection of Multiplexed DNA via Electrostatic Attraction and π-π Stacking Interactions

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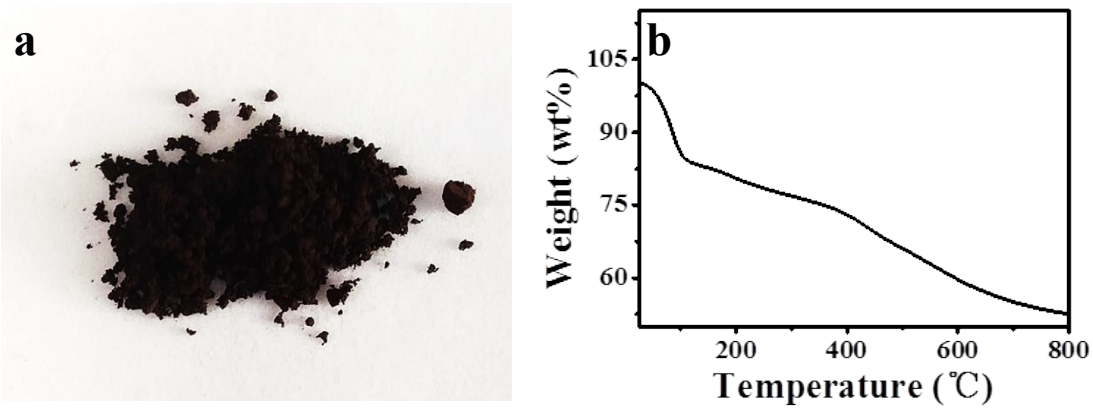


Fig. S1. (a) The picture of POP powder; (b) TGA of POP.

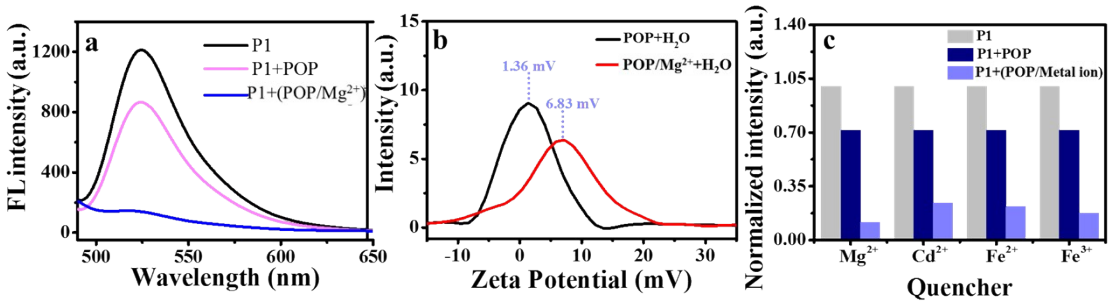


Fig. S2. (a) Fluorescence emission spectra of P1, P1+POP and P1+ (POP/Mg^{2+}); (b) The zeta potentials of POP+H_2O and POP/Mg^{2+}+H_2O; (C) Normalization intensity of P1, P1+POP, P1+(POP/Metal ion) for Mg^{2+}, Cd^{2+}, Fe^{2+} and Fe^{3+}, respectively.

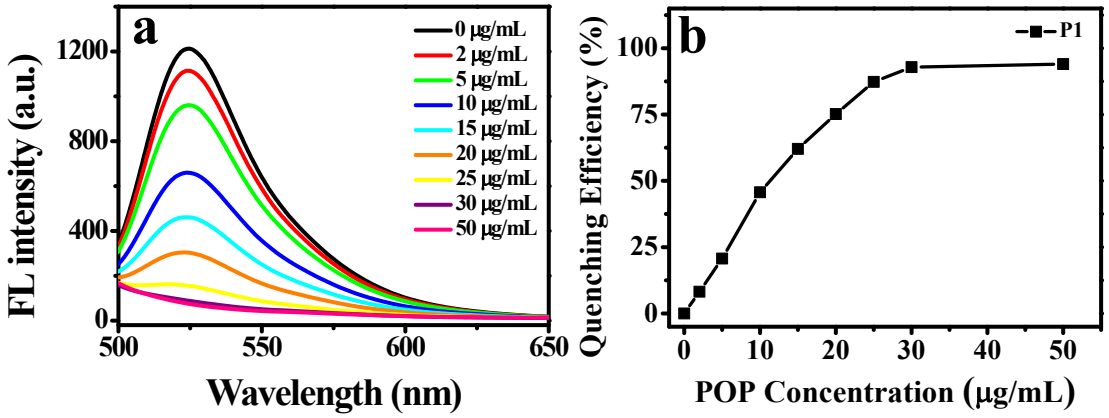


Fig. S3. (a) Fluorescence emission spectra and quenching efficiency (b) of P1 (25 nM) with different concentrations of POP (0-50 mg/mL).

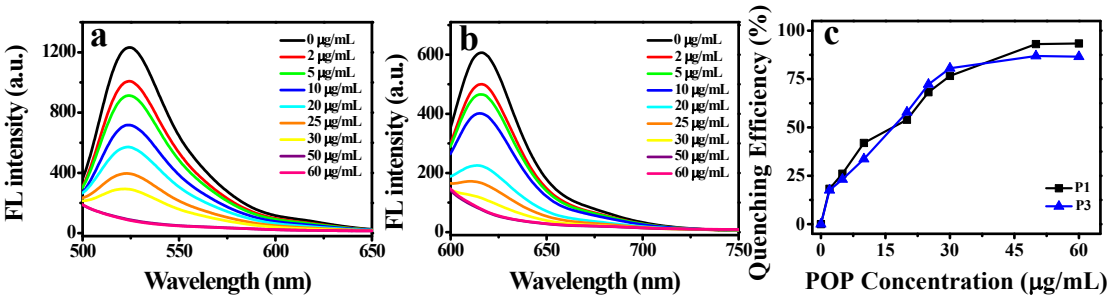


Fig. S4. Fluorescence emission spectra of P1 (a), P2 (b), and corresponding quenching efficiency (c) with different concentrations of POP (0-60 mg/mL).

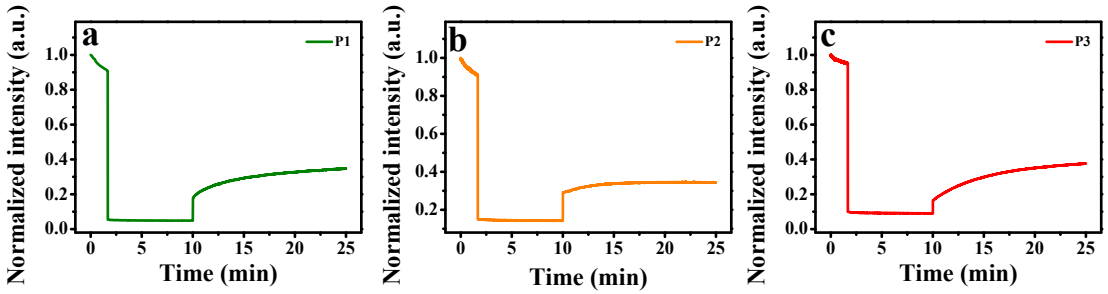
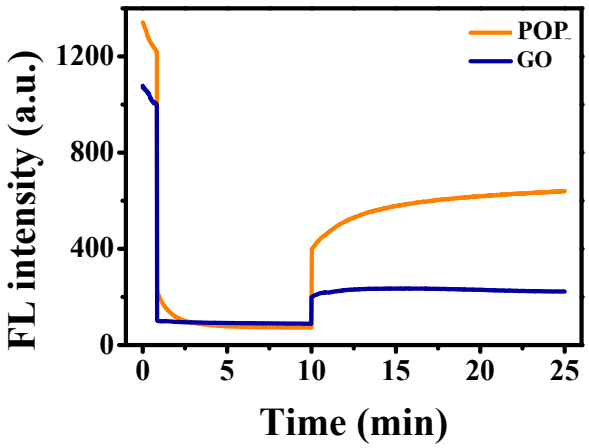


Fig. S5. Fluorescence intensity of P1 (a), P2 (b) and P3 (c) change with time in the presence of POP and Target DNA successively.



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113 **Fig. S6.** Fluorescence intensity of P1 change with time upon the introduction of

114 different quenchers (GO and POP, 30 μg/mL) and T1 (200 nM).

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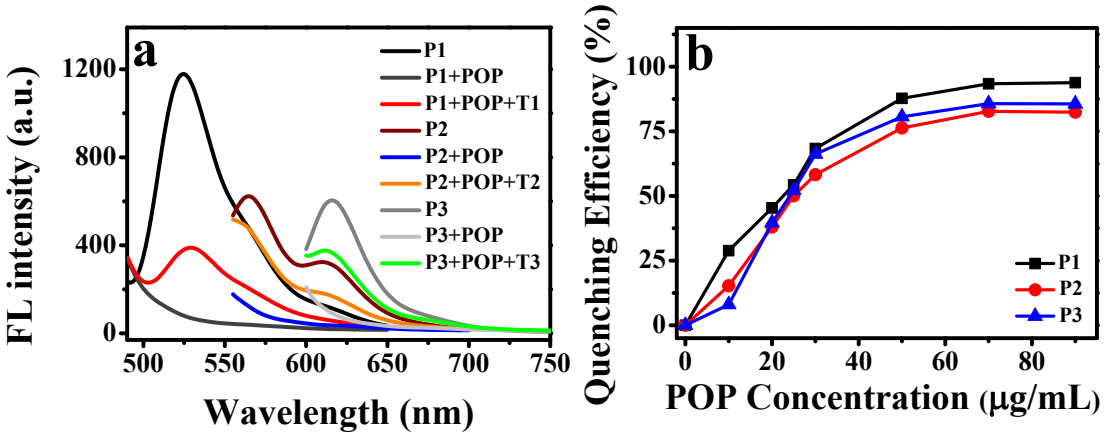

Fig. S7. (a) Fluorescence spectra of probes (P1, P2, and P3) under different conditions (P, P+POP, P+POP+T), respectively. (b) Quenching efficiency of P (P1, P2 and P3) caused by POP with different concentrations (0, 10, 20, 25, 30, 50, 70 and 90 μg/mL).

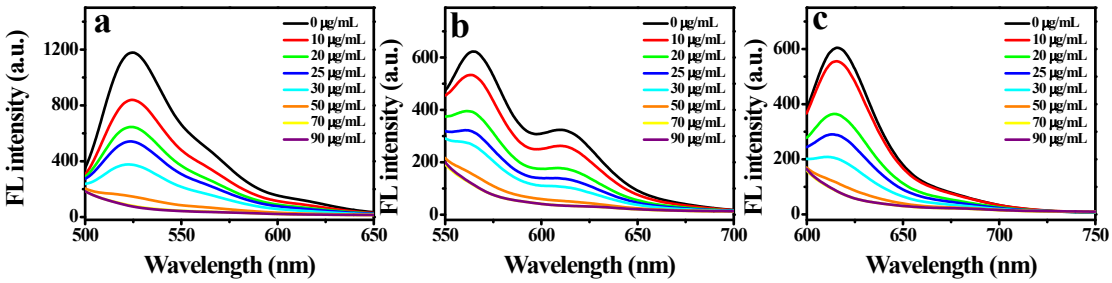

Fig. S8. Fluorescence emission spectra of P1 (a), P2 (b) and P3(c) change with different concentrations of POP (0-90 mg/mL).

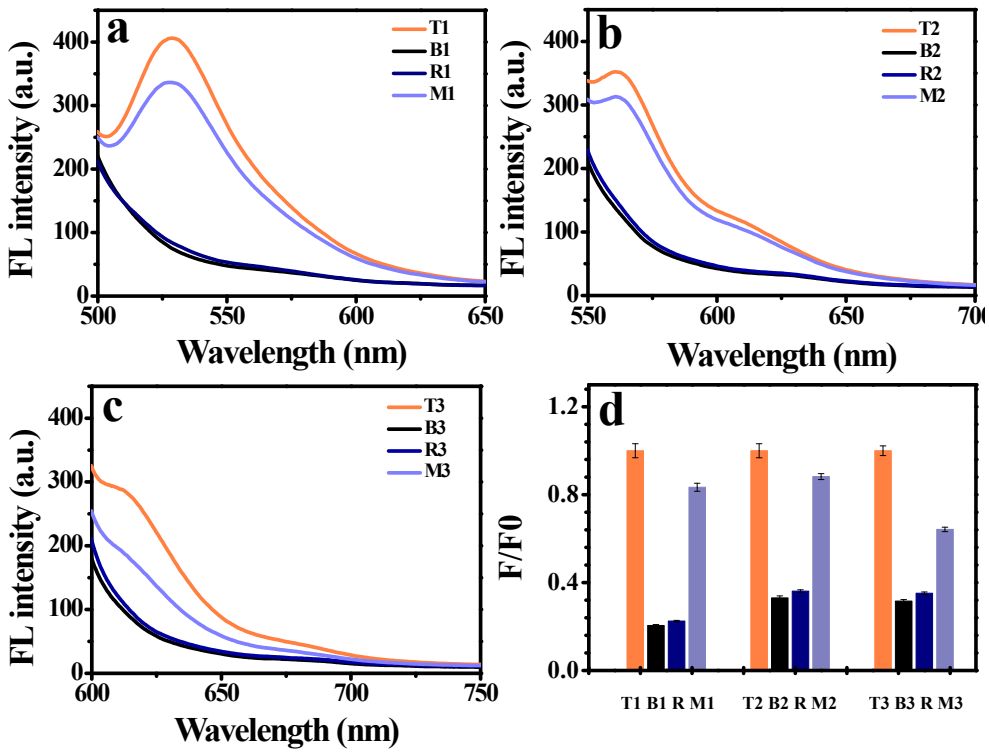

Fig. S9. Fluorescence spectra of probes (P1, P2 and P3) in one system toward T1 (a), T2 (b) and T3 (c); (d) Specificity of probes (P1, P2, P3) for targets (T1, T2, T3). B (1-3), blank; R (1-3), random sequence for P (1-3); M (1-3), base mismatched sequence for P (1-3), respectively.

Table S1. DNA sequences used in this work.

Oligonucleotide	Sequence (5-3)*
P1	CAGTTACATTCTCCCAGTTGATT-FAM
P2	ACCTGGGGGAGTATTGCGGAGGAAGGT-Cy3
P3	AGACTCTTGAGTTCTCAGTATG-Texas Red
T1	AATCAACTGGGAGAATGTAACTG
T2	ACCTTCCTCCGCAATACTCCCCCAGGT
T3	CATACTGAGAACTCAAGAGTCT
M1	AATCAACTGTGAGAATGTAACTG
M2	ACCTTCCTCCGCATTACTCCCCCAGGT
M3	CATATTGAGAACTCAAGAGTCT
R	ACCTGGGGGAGTATTGCGGAGGAAGGT

* The mutation base is indicated by underline

Table S2. Comparison of different fluorescent DNA sensors.

Materials	Sensitivity	Detection time	Fluorescent reporter	Multiplexed detection	Reference
SWNT	4 nM	several hours	FAM	Not reported	[39]
AuNP	nM	minutes	Rhodamine 6G	Yes	[40]
Graphene oxide (GO)	100 pM	≈1 min	FAM, Cy3, ROX	Yes	[41]
GO (premixing)	≈10 nM	30 min	FAM	Not reported	[42]
GO	2 nM	30 min	FAM	Not reported	[43]
GO	0.5 nM	60-90 min	Silver	Yes	[44]
GO	75 nM	30 min	Graphene quantum dots	Not reported	[45]
g-C_3N_4	81 pM	Not reported	FAM, ROX	No	[46]
MOFs(UiO-66-NH_2)	10 nM	20 min	FAM	Not reported	[47]
MOFs(Cu(H_2dtoa))	3 nM	4 h	FAM	Not reported	[48]
POP	50 pM	25 min	FAM, Cy3, Texas Red	Yes	This work

209 **Table S3.** The quenching efficiency and recovery of different detected system.

System	Target DNA	QE (%)	Recovery (%)
Single chain	T1	94.43	38.37
	T2	83.12	55.90
	T3	85.80	53.04
Double chains	T1&T2	87.61	28.70
		68.18	83.09
	T2&T3	70.85	78.29
		48.92	70.34
	T1&T3	93.25	24.55
		86.92	29.68
Three chains	T1&T2&T3	92.75	31.18
		87.62	28.64
		89.63	25.05

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