Electronic Supplementary Material (ESI) for Journal of Materials Chemistry B.

Supporting Information

Pyrophosphate ion-triggered competitive displacement of ssDNA from metal-organic framework and its application in fluorescent sensing of alkaline phosphatase

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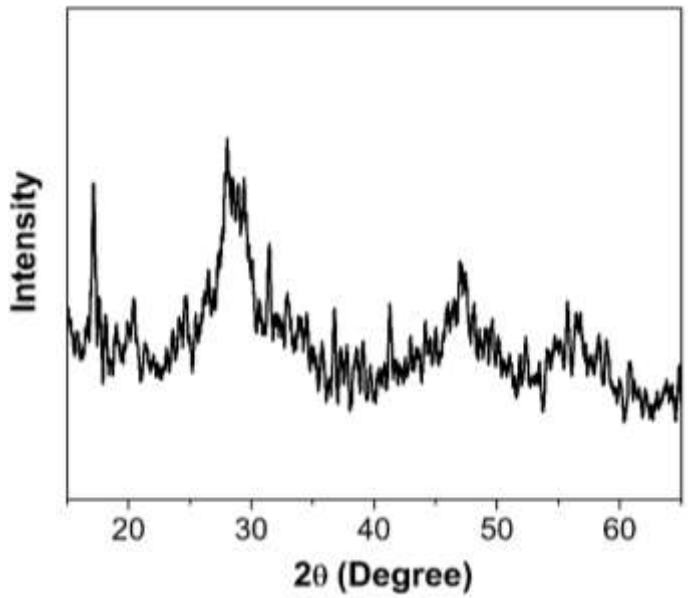


Figure S1. Powder XRD pattern of MVCM.

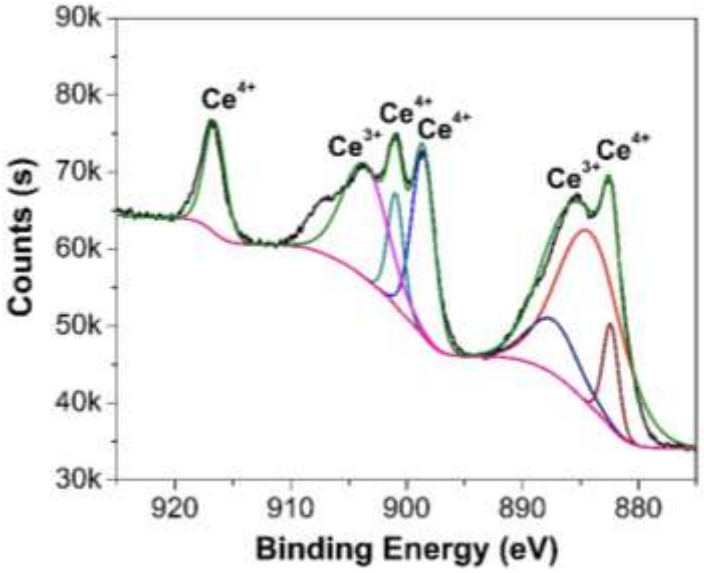


Figure S2. XPS spectrum of MVCM.

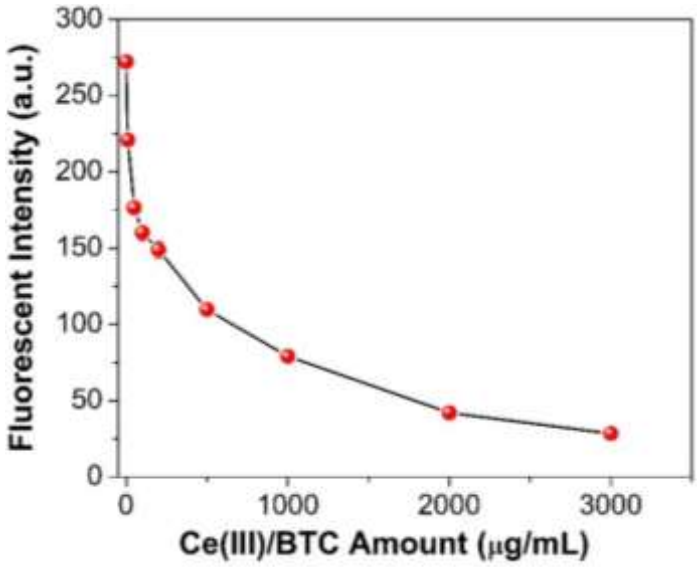


Figure S3. Effects of Ce(III)/BTC amounts on the fluorescence of F-DNA.

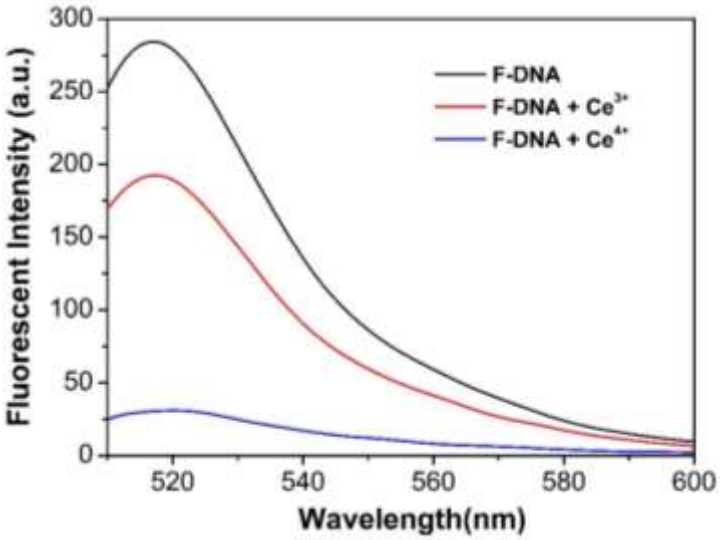


Figure S4. The emission spectra of F-DNA, F-DNA + Ce^{3+} and F-DNA + Ce^{4+}.

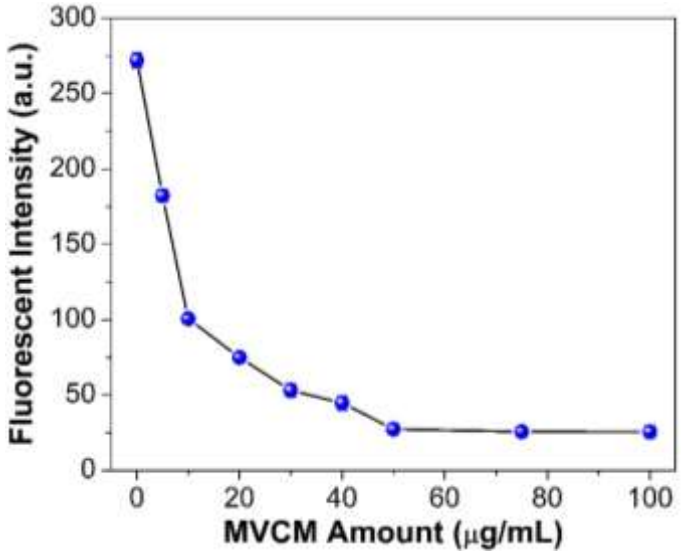


Figure S5. The changes of F-DNA fluorescence in the presence of MVCM with different concentrations.

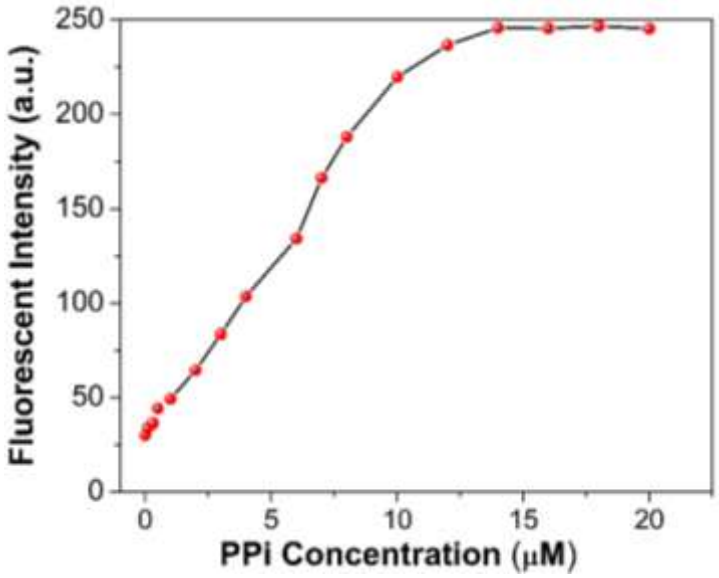


Figure S6. The fluorescent changes of MVCM/F-DNA complex after the addition of PPi with concentration from 0 to 20 μM.

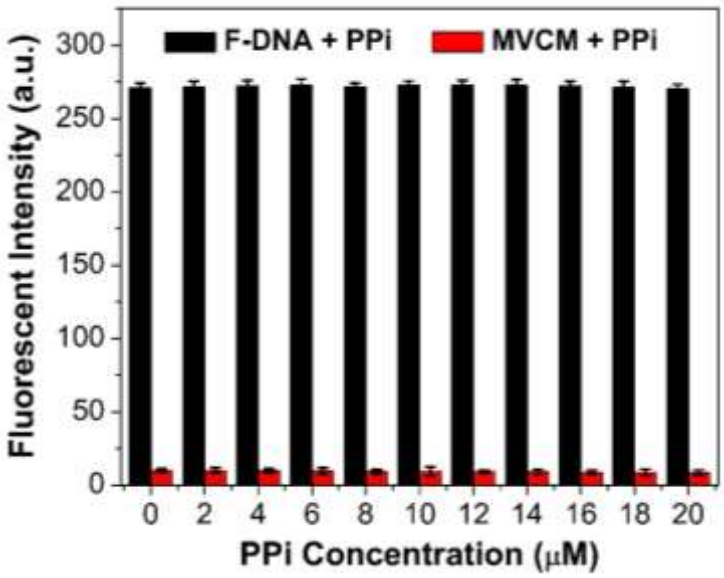
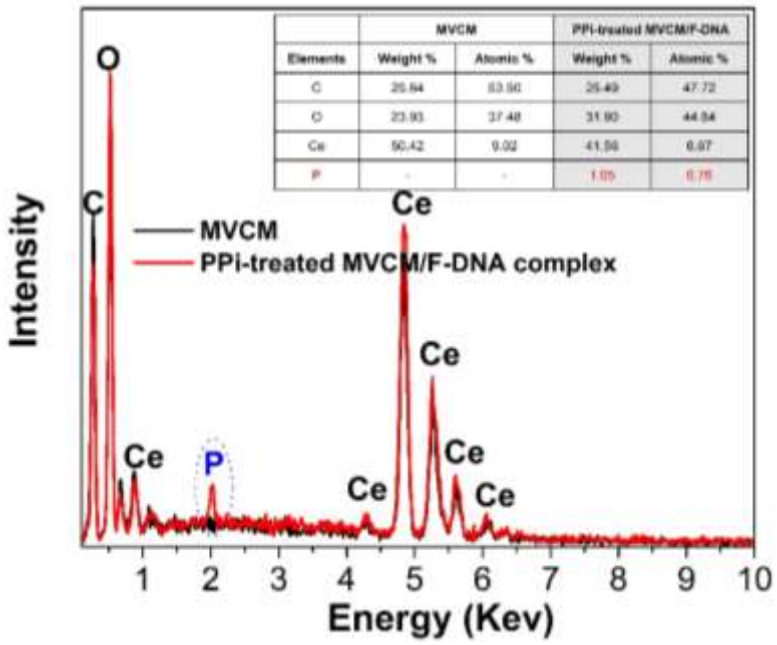


Figure S7. The effects of PPi with different concentrations on the fluorescence of individual F-DNA and MVCM.



	MVCM		PPi-treated MVCM/F-DNA	
Elements	Weight %	Atomic %	Weight %	Atomic %
C	26.64	63.90	25.49	47.72
O	23.93	37.48	31.90	44.84
Ce	50.42	9.02	41.56	6.97
P	-	-	1.05	0.76

Figure S8. EDS spectra of pure MVCM (black line) and MVCM/F-DNA complex treated by excess PPi (red line).

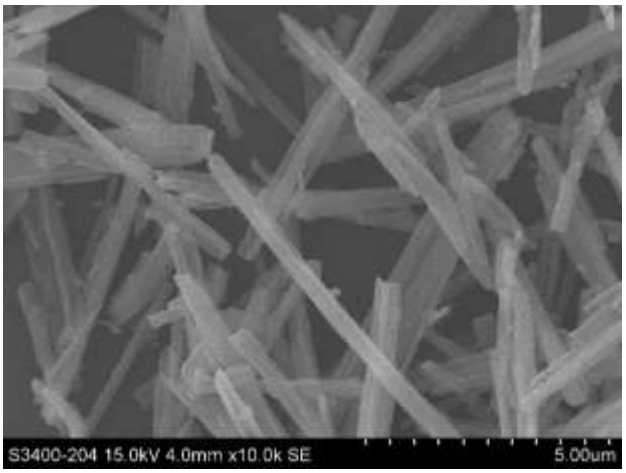


Figure S9. SEM image of MVCM/F-DNA complex treated by excess PPi.

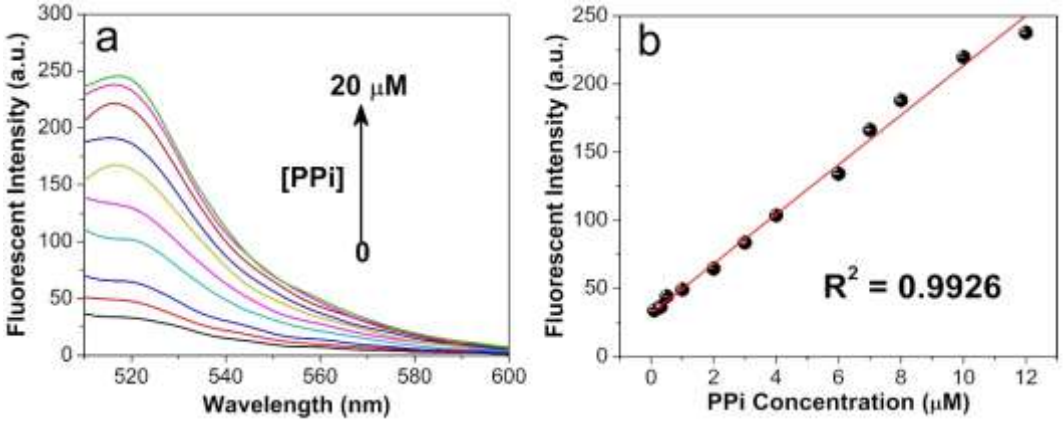


Figure S10. (a) Emission spectra of MVCM/F-DNA complex in the presence of PPi with different concentrations (0 - 20 μM). (b) linear curve of fluorescent intensity of F-DNA at 520 nm versus PPi concentrations.

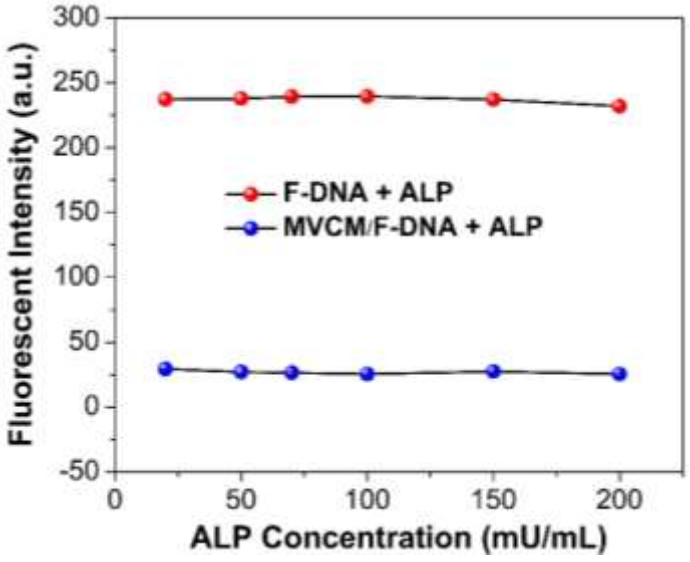


Figure S11. The effects of ALP with concentration from 20 to 200 mU/mL on the fluorescence of F-DNA alone and MVCM/F-DNA complex.

Table S1. Comparison of various fluorescent sensors for the detection of ALP.

Sensors	Substrates	Linear range (mU/mL)	Detection limit (mU/mL)	Refs
Conjugated Polyelectrolyte polymer	PPi	0 - 450	1.5	1
dsDNA-templated CuNPs	PPi	0.3 - 7.5	0.3	2
Carbon quantum dots	PPi	16.7 - 782.6	1.1	3
Upconversion nanoparticles	PPi	62.5 - 875	19	4
CdTd QDs-β-cyclodextrin	pNPP	0 - 800	10	5
Carbon dots-Cu(II)	PPi	2.5 - 40	1	6
Cu(II)-dependent DNAzyme	AAP	0.36 - 54.55	0.14	7
MVCM/F-DNA complex	PPi	1 - 100	0.18	This work

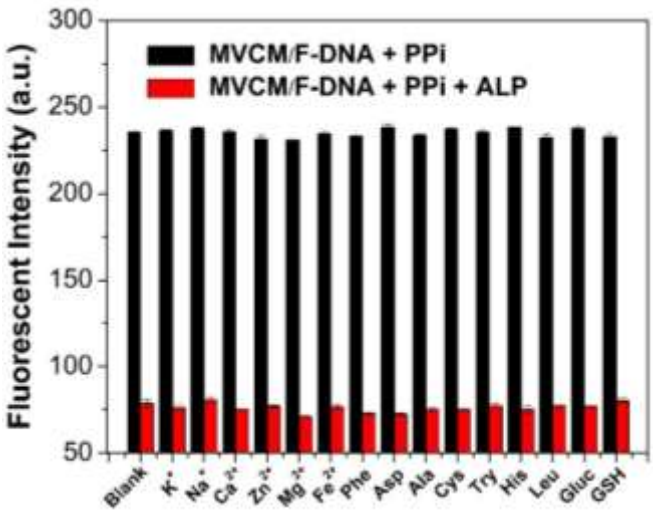


Figure S12. The effects of metal ions and biological species that are commonly found in biological fluids on the PPi-triggered displacement assay and its corresponding ALP hydrolysis assay.

Table S2. Determination of the level of ALP in serum samples

Sample	Added (mU/mL)	Detected (mU/mL)	Recovery (%)	RSD (n =3, %)	pNPP assay
1	5	5.03	100.60	0.36	4.98
2	10	9.82	98.20	0.96	10.02
3	20	19.13	95.65	0.45	19.83
4	30	28.97	96.57	1.03	29.73

References

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