A Potential Application of Polyoxometalates to Discrimination of Human Papillomavirus in Different Subtypes

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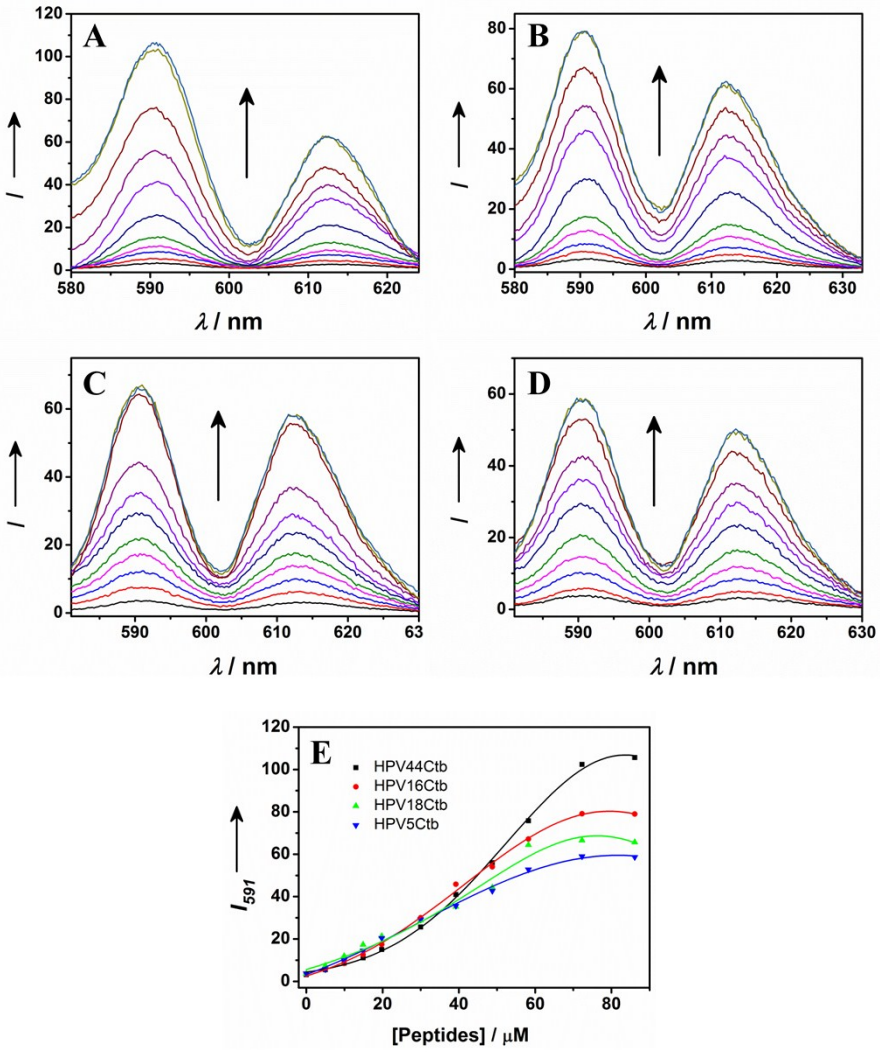

Fig. **S1** The fluorescence spectra (A-D) and corresponding intensities (E) changes of EuPW11 (30.0 μM) in MES-NaOH buffer solution (10 mM, pH 6.0) upon gradual addition of HPV44Ctb, HPV16Ctb, HPV18Ctb and HPV5Ctb, respectively.

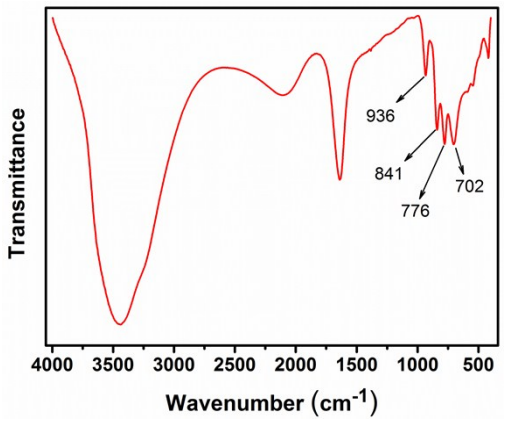

Fig. S2 The FT-IR spectra of EuW10. Peaks ranging from 400–1100 cm^{-1} correspond to the structural vibrations of EuW10, the signals at 936 cm^{-1} for $\nu_{(W=O)}$, 841, 776 and 702 cm^{-1} for $\nu_{(W-O-W)}$, showing characteristic bands of polyoxometalate framework.[1]

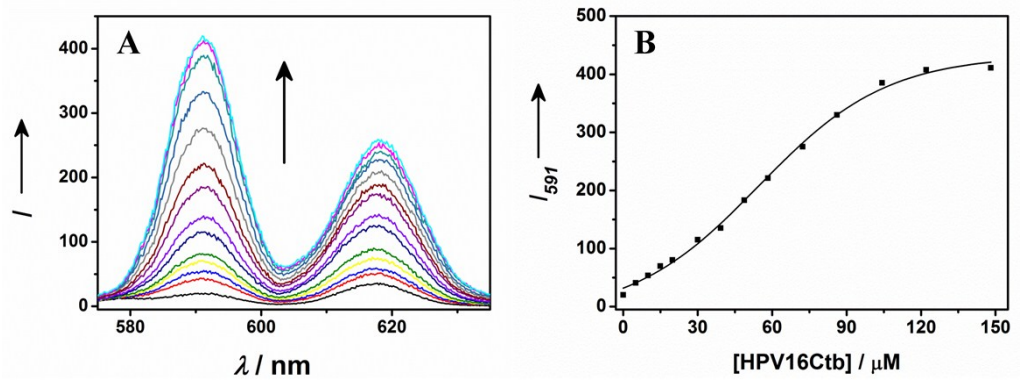

Fig. S3 The fluorescence spectra (A) and corresponding intensities (B) changes of EuW10 (30 μM) in MES-NaOH buffer solution (10 mM, pH 6.0) upon gradual addition of HPV16Ctb.

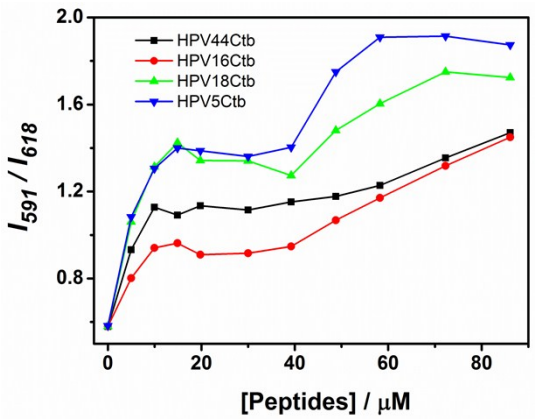

Fig. S4 Intensity ratios of 591 to 618 nm (I_{591}/I_{618}) for EuW10 (30 μM) as induced by HPV44Ctb, HPV16Ctb, HPV18Ctb and HPV5Ctb in MES-NaOH buffer solution (10 mM, pH 6.0) at room temperature (25 °C), respectively.

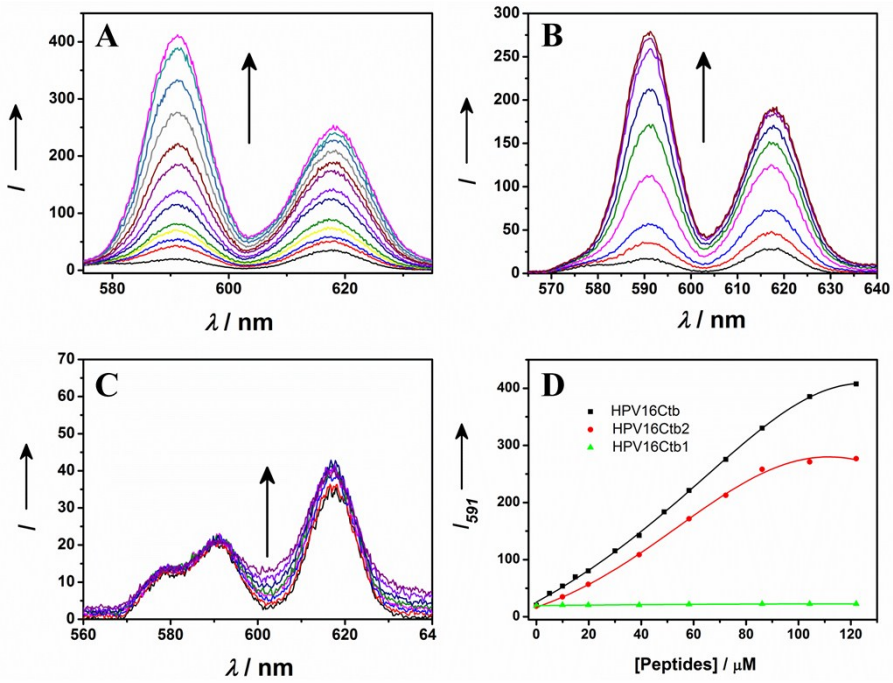

Fig. S5 The fluorescence spectra (A-C) and corresponding intensities (D) changes of EuW10 (30.0 μM) in MES-NaOH buffer solution (10 mM, pH 6.0) upon gradual addition of HPV16Ctb (A), HPV16Ctb2 (B) and HPV16Ctb1 (C), respectively.

Table S1. Lifetimes of EuW10 (30 μM in MES-NaOH buffer solution) in absence and presence of different peptides.

Lifetimes & Ratios		τ_1/μs	a_1	τ_2/μs	a_2
30 μM EuW10		248.3	100%	_	_
30 μM EuW10	+HPV44Ctb	277.4	1.31%	2477.4	98.69%
	+HPV16Ctb	308.8	1.99%	2538.9	98.01%
	+HPV18Ctb	761.5	6.99%	3798.2	93.01%
	+HPV5Ctb	929.5	4.97%	4165.0	95.03%

Table S2. Thermodynamic parameters for the interaction of four peptides with EuW10 in MES-NaOH buffer solution (10 mM, pH 6.0), at three temperatures.

Peptide	Temp / °C	*n*	*K*/ M^{-1}	Δ*H*/ (Kcal·mol^{-1})	Δ*G*/ (Kcal·mol^{-1})	*T*Δ*S*/ (Kcal·mol^{-1})
HPV44Ctb	5	0.957	$(5.09\pm0.42)\times10^5$	-15.65±0.18	-7.28±0.18	-8.372
	15	0.932	$(4.02\pm0.22)\times10^5$	-14.00±0.11	-7.40±0.11	-6.599
	25	0.882	$(3.43\pm0.21)\times10^5$	-12.78±0.13	-7.56±0.13	-5.217
[2] HPV16Ctb	5	0.872	$(6.47\pm0.74)\times10^5$	-16.23±0.25	-7.41±0.25	-8.817
	15	0.807	$(6.12\pm0.50)\times10^5$	-14.52±0.16	-7.63±0.16	-6.886
	25	0.794	$(5.06\pm0.36)\times10^5$	-12.80±0.14	-7.79±0.14	-5.009
[2] HPV18Ctb	5	0.901	$(3.57\pm0.42)\times10^6$	-22.65±0.18	-8.35±0.18	-14.297
	15	0.887	$(2.59\pm0.20)\times10^6$	-21.93±0.13	-8.44±0.13	-13.485
	25	0.783	$(2.36\pm0.16)\times10^6$	-21.28±0.12	-8.70±0.12	-12.582
HPV5Ctb	5	1.030	$(8.10\pm0.65)\times10^6$	-24.22±0.35	-8.28±0.35	-15.938
	15	0.931	$(7.49\pm0.55)\times10^6$	-23.33±0.09	-9.07±0.09	-14.263
	25	0.842	$(6.62\pm0.63)\times10^6$	-22.69±0.12	-9.30±0.12	-13.387

References

1. J. Xu, S. Zhao, Z. Han, X. Wang and Y.-F. Song, *Chem. Eur. J.*, 2011, **17**, 10365–10371.
2. T. Zhang, H. W. Li, Y. Wu, Y. Wang and L. Wu, *J. Phys. Chem. C*, 2015, **119**, 8321−8328.