Supplementary Information

Target-engineered photo-responsive of the DNA strands: a novel signal-on photoelectrochemical biosensing platform for Ochratoxin A

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UV-vis diffuse reflectance spectroscopy (DRS) was employed to investigate the optical properties of $BiVO_4$, $BiVO_4@MoS_2$ and Au-$BiVO_4@MoS_2$. As displayed in Fig. S1, a strong absorption edge of pure $BiVO_4$ is exhibited at about 550 nm owing to the intrinsic band gap absorption. After MoS_2 was formed on the surface of $BiVO_4$, the light absorption of the composite in the visible light region was obviously enhanced. In addition, upon compositing with Au nanoparticles, the optical absorption was further increased, indicating the better visible-light photocatalytic performance of the Au-$BiVO_4@MoS_2$ nanocomposite. Therefore, sensitizing $BiVO_4$ with MoS_2 and Au can effectively enhance the photocurrent due to the highly increment absorption of visible light and photo-to-current conversion efficiency.

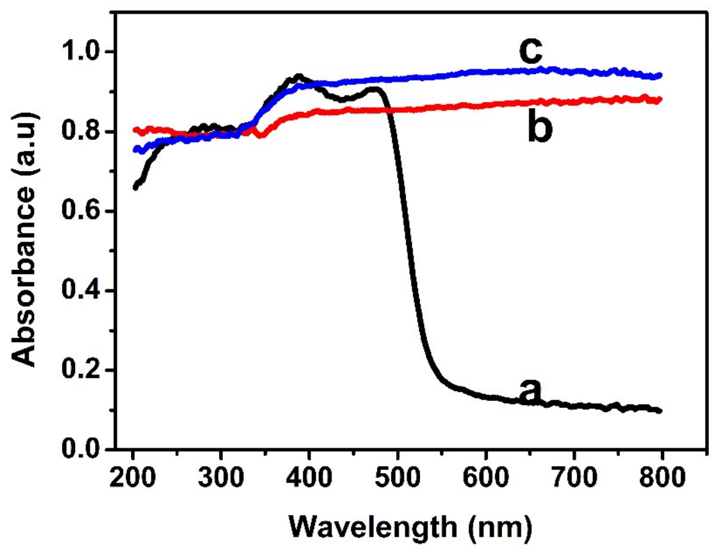

Figure S1. UV-vis diffuse reflectance spectra (DRS) of $BiVO_4$ (a), $BiVO_4@MoS_2$ (b) and Au-$BiVO_4@MoS_2$ (c) composite.

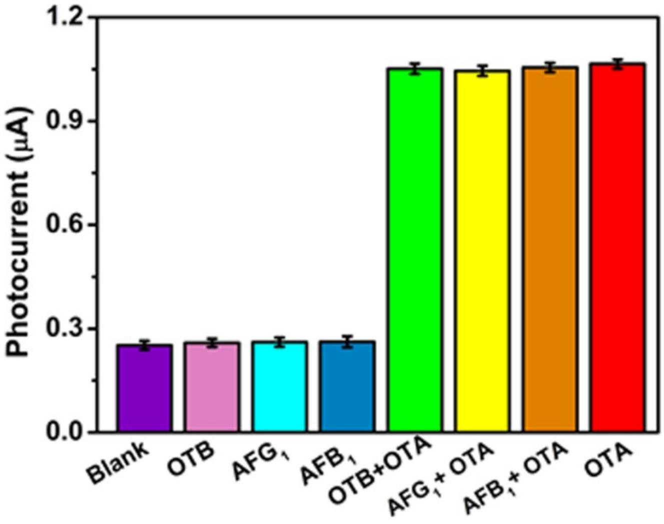

Figure S2. The specificity of the PEC DNA biosensor (OTA: 2.0 ng mL^{-1}, interfering substance: 200 ng mL^{-1}).

Table S1. Analytical Performance of the PEC DNA sensor with other methods

Method	Linear range	Detection limit ($pg\ mL^{-1}$)	Ref.
Photoluminescence immunosensor	0.01-5 ng mL^{-1}	4.4	1
Electrochemical aptasensor	0.2-500 nM	29.47	2
Electrochemical aptasensor	1 pg mL^{-1}-0.1 μg mL^{-1}	0.7	3
Electrochemical sensor	1 pg mL^{-1}-1 ng mL^{-1},	0.5	4
PEC immunosensor	0.05-300 nM	4.038	5
MIP-PEC sensor	0.01-1000 ng mL^{-1}	0.51	6
PEC immunosensor	5-750 ng mL^{-1}	1.7	7
Fluorescent aptasensor	2.5-250 nM	807.6	8
Colorimetirc aptasensor	1.25-250 nM	27.86	9
PEC aptasensor	0.25 pg mL^{-1}-250 ng mL^{-1}	0.14	This work

PEC: photoelectrochemical; MIP-PEC: molecular imprinting photoelectrochemical.

Table S2. Determination of the OTA in red wine with the proposed PEC DNA sensor

Red Wine Sample	Added OTA (ng mL^{-1})	Found (ng mL^{-1})	RSD (%)	Recovery (%)
1	0.0005	0.000471	4.9	94.2
2	0.001	0.00953	5.3	95.3
3	0.05	0.051	4.3	102
4	0.01	0.00975	3.6	97.5
5	0.1	0.0967	4.8	96.7
6	1	1.08	5.1	108

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