Electronic Supplementary Information (ESI) for:

Sensitive electrochemical aptasensor for detection of Aflatoxin B2 based on polyacrylamide/phytic acid/polydopamine hydrogel modified screen printed carbon electrode

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Contents

2. Additional Figures

Fig.S1 A photograph of the PAM/PA/PDA hydrogel inside a glass vial.

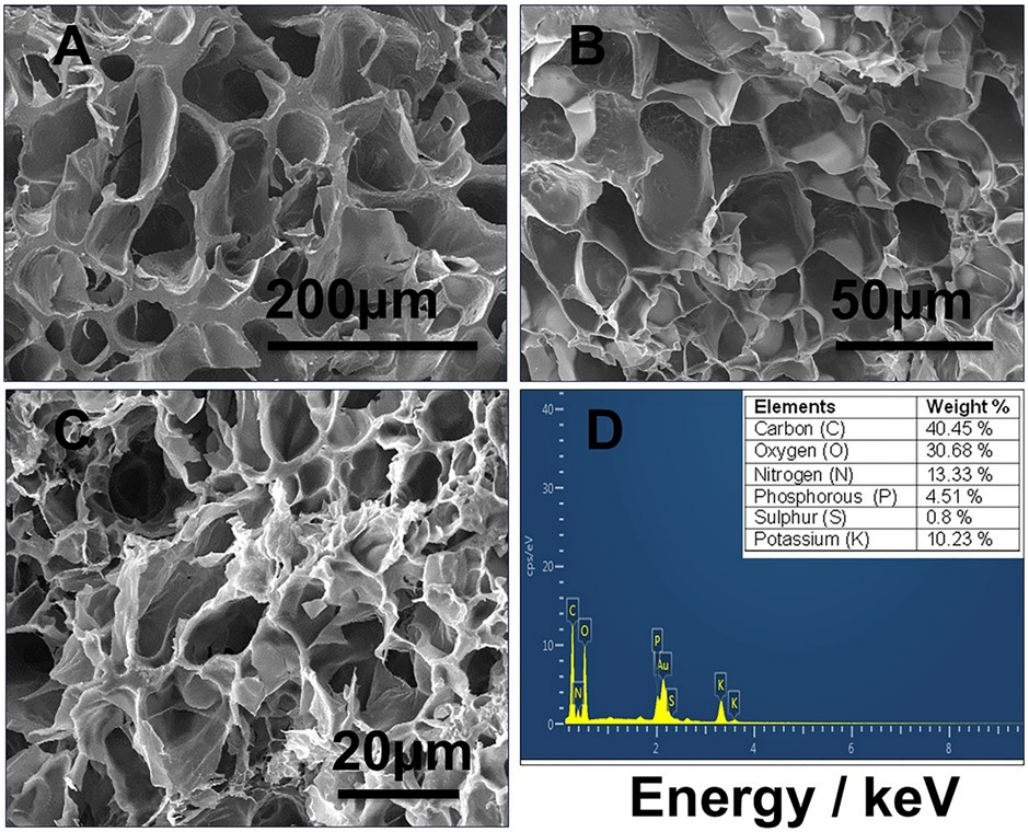

Fig.S2 (A, B and C) SEM micrographs of PAM/PA/PDA hydrogel of different magnification and (D) EDX of PAM/PA/PDA hydrogel

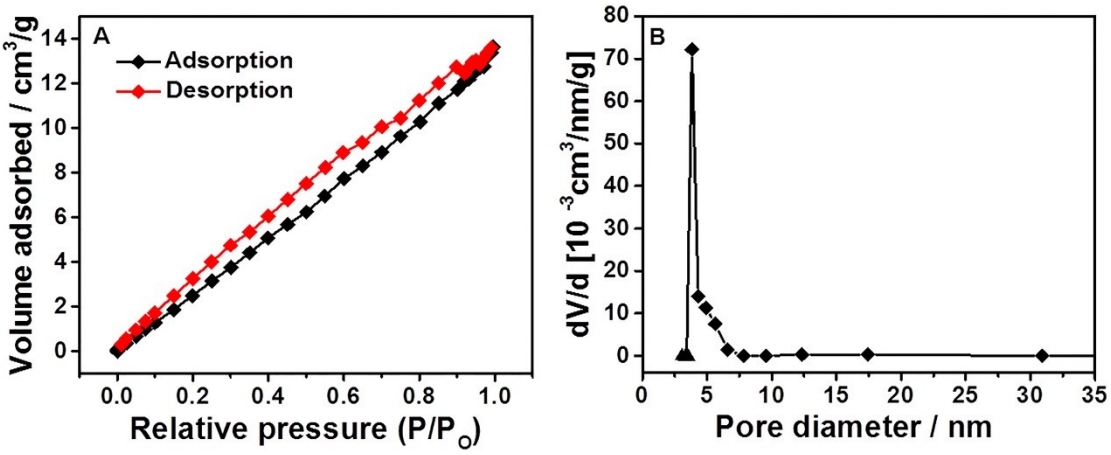

Fig.S3 (A) N_2 adsorption-desorption isotherms, (B) BJH pore-size distribution of dehydrated PAM/PA/PDA hydrogel.

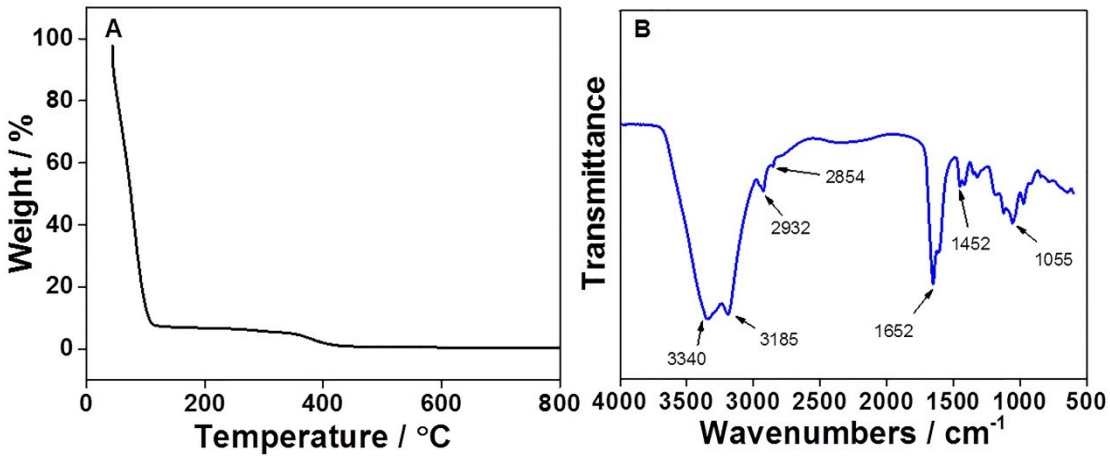

Fig.S4 (A) Thermal gravimetric analysis of PAM/PA/PDA hydrogel and (B) FTIR spectrum of PAM/PA/PDA hydrogel.

The H_2O content of the PAM/PA/PDA hydrogel was around 90 % (wt/wt) (as shown in Fig.S4A). The high H_2O content arises from hydrophilic functional groups attached to the polymeric backbone, which provides a favourable microenvironment for immobilizing biomolecules.[S1,S2] The FTIR spectrum of PAM/PA/PDA hydrogel is shown in Fig.S4B**.** The characteristic peak at 3340 cm^{-1} and 3185 cm^{-1} are assigned to asymmetric and symmetric stretching vibrations of NH_2.[S3] Whereas the broad peak around 3300 cm^{-1} is attributed to stretching vibrations of OH that indicate an abundance of hydroxyl groups.[S4] In addition, the strong absorption peaks at 1652 cm^{-1} and 1609 cm^{-1} are arised from the vibrations of C=O and C=C, respectively.[S5] Beside the band at 1452 cm^{-1} is associated with the vibration of C-N (C-N stretching for primary amide), and the characteristic bands of PO_4^{3-} are appeared at 1055 cm^{-1}. This result confirmed presence of abundant functional groups on the surface of PAM/PA/PDA hydrogel which is considered advantageous for immobilizing aptamer onto an electrode surface.

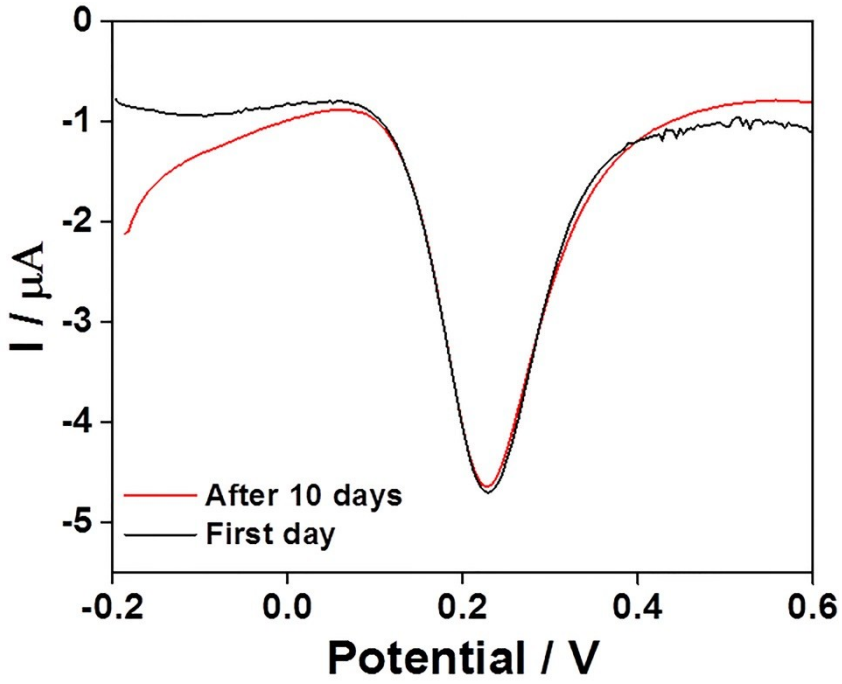

Fig.S5 Stability of the proposed SPCE/PAM/PA/PDA/Apt.

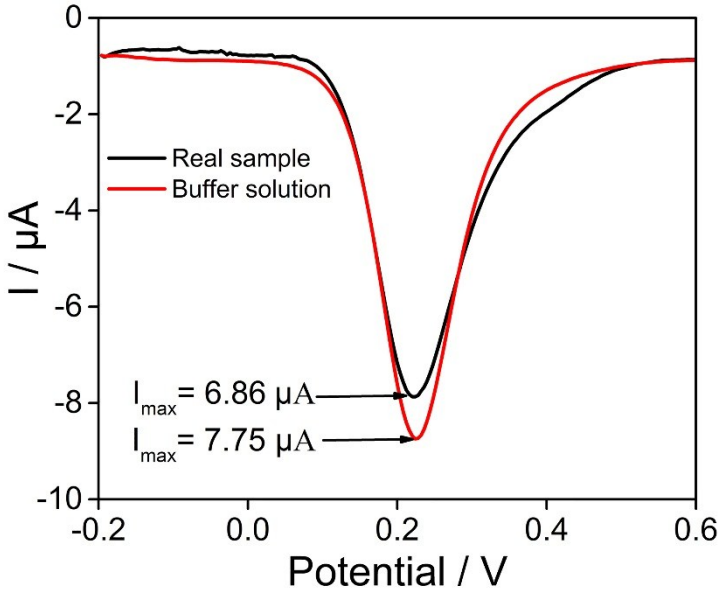

Fig.S6 DPV responses of the SPCE/PAM/PA/PDA/Apt in buffer and real samples containing $[Fe(CN)_6]^{3-/4-}$ redox couple (5 mmol L^{-1}) without AFB2.

3. Additional Table

Table S1. Optimization of precursor concentrations and reaction conditions for preparation of PAM/PA/PDA hydrogel

PAM/PA/PDA hydrogels	DA/AM (wt%)	AM (g)	KPS/AM (wt%)	TMEDA (μL)	MBA/AM (wt%)	Water (μL)	PA/AM (wt%)	Time (min)
A	0.5	0.28	8	20	0.27	250	0.31	1
B	0.5	0.28	8	5	0.27	250	0.31	3
C	0.5	0.28	8	1	0.27	250	0.31	8
D	0.8	0.28	8	2	0.27	250	0.31	15
E	0.8	0.28	8	0.5	0.27	250	0.31	120
F	4.65	0.28	8	0.5	0.27	250	0.31	-

Chemicals used: dopamine (DA), acrylamide (AM), potassium peroxydisulfate (KPS), N, N'-Methylene bisacrylamide (MBA) and tetramethylethylenediamine (TMEDA).

The polymerization parameters such as reaction time, monomer concentration, and initiator concentration were optimized to obtain PAM/PA/PDA hydrogels of desired properties. As shown in Table S1, the PAM/PA/PDA hydrogel cannot form when the weight ratios of DA/AM were higher than 0.8wt%, because the reductive DA molecules affected the activity of the initiator (KPS) and thus retard the polymerization of AM monomers.[S6] In this regard, row D was selected for preparation of PAM/PA/PDA hydrogel by taking into consideration the modification time of SPCEs.

4. Additional References

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