

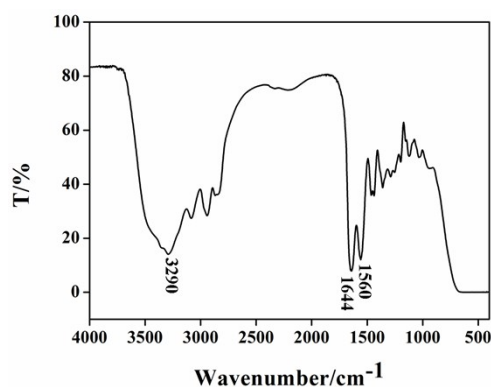
## Supporting Information

### An electrochemical paracetamol sensor based on layer-by-layer covalent attachment of MWCNTs and G4.0 PAMAM modified GCE

YanJun Zhang, Xiuhui Liu\*, Lin Li, Zhipan Guo, Zhonghua Xue, Xiaoquan Lu

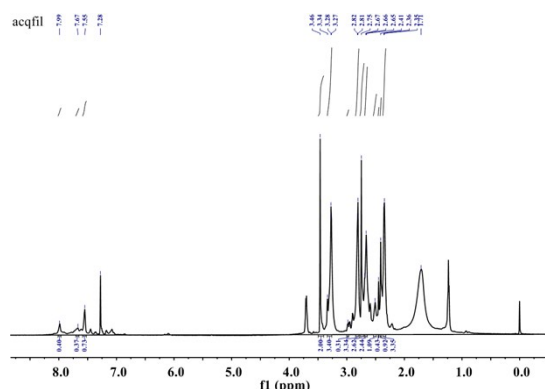
*Key Laboratory of Bioelectrochemistry & Environmental Analysis of Gansu Province, College of Chemistry &  
Chemical Engineering, Northwest Normal University, Lanzhou, 730070, China*

The G4.0 PAMAM was identified by FTIR spectroscopy. For G4.0 PAMAM (Fig. S1), the absorption peaking at  $3290\text{ cm}^{-1}$  is due to the stretching vibration of  $\text{-NH-}$  group and the bands peaking at  $1644$  and  $1560\text{ cm}^{-1}$  correspond to amides ( $\text{-CO-NH-}$ ) I and II<sup>1</sup>.



**Figure S1.** FT-IR spectrum of the G4.0 PAMAM dendrimer.

Fig. S2 shows  $^1\text{H}$  NMR spectrum of G4.0 PAMAM:  $\delta_{\text{H}}$  (600 MHz;  $\text{CDCl}_3$ ;  $\text{Me}_4\text{Si}$ ): 1.71 (2H, s,  $\text{-NH}_2$ ), 2.35~2.36 (2H, d,  $\text{-CH}_2\text{CONH-}$ ), 2.41 (1H, s,  $\text{-CH}_2\text{CONH-}$ ), 2.66~2.75 (5H, m,  $\text{-CONHCH}_2\text{CH}_2\text{N-}$ ), 3.24~3.35 (4H, m,  $\text{-CH}_2\text{NH}_2$ ), 3.46 (2H, d,  $\text{-NHCH}_2$ ), 7.55 (1H, s,  $\text{-NH-}$ )<sup>2</sup>.



**Figure S2.**  $^1\text{H}$  NMR spectrum of the G4.0 PAMAM dendrimer.

\* Corresponding author. Tel.: +86 0931 7975276; fax: +86 0931 7971323. E mail: [liuxh@nwnu.edu.cn](mailto:liuxh@nwnu.edu.cn)

## Optimization of the experimental conditions

To determine the accumulation time of PAT, the (MWCNTs-G4.0)<sub>6</sub>/GCE were immersed in 0.2 M PBS (pH 7.0) containing 0.1 mM PAT. The *I*<sub>pa</sub> of PAT increased with increasing accumulation time up to 200 s as shown in Fig.S3A. This value was used in the following study. The relationship between the *I*<sub>pa</sub> and the LBL assembly layers is shown in Fig.S3B, although the peak current of 7<sup>th</sup> layer (8.824 μA) is a little higher than that of 6<sup>th</sup> layer (8.759 μA), considering the prepare time of the modified electrode, we choose the six LBL assembly layers in the experiments. From Fig. S4, one can see that the *I*<sub>pa</sub> reached its maximum value at pH 7.0. Therefore pH 7.0 is taken as the optimum pH for this study.

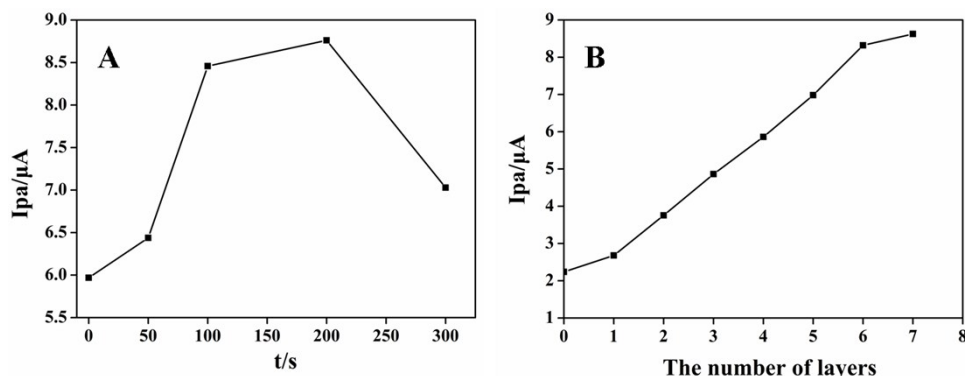


Fig. S3. Influence of accumulation time of the *I*<sub>pa</sub> for 0.1 mM PAT at (MWCNTs-G4.0)<sub>6</sub>/GCE (A), The relationship between the PAT *I*<sub>pa</sub> and the LBL layers (B).

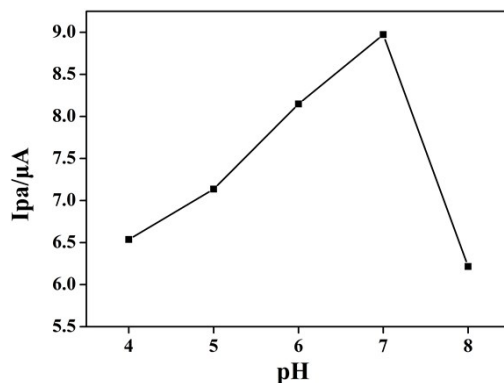


Fig.S4 Relationship between *I*<sub>pa</sub> and pH in 0.2 M PBS (pH 7.0) containing 0.1 mM PAT, scan rate: 50 mV s<sup>-1</sup>.

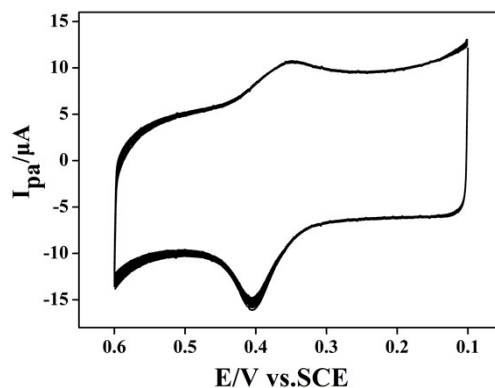
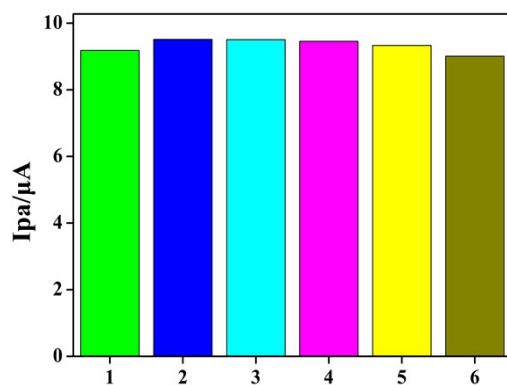
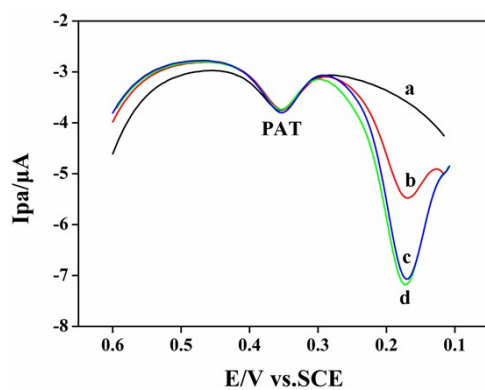


Fig.S5. 50 segments continuous CV scanning of (MWCNTs-G4.0)<sub>6</sub>/GCE in 0.2M PBS (pH 7.0) containing 0.1mM PAT, at 50 mV s<sup>-1</sup>.



**Fig.S6.** Column graph of CV signals of PAT recorded at (MWCNTs-G4.0)<sub>6</sub>/GCE : (1) to (6). Column graph of CV signals of 0.1mM PAT in 0.2 M PBS (pH 7.0) at six different electrode prepared under the same conditions.



**Fig. S7.** DPVs of the (MWCNTs-G4.0)<sub>6</sub>/GCE in 0.2 M PBS (pH 7.0): (a) 0.1mM PAT; (b) 0.1mM PAT and 1.0mM DA; (c) 0.1mM PAT, 1.0mM DA and 0.1 mM UA; (d) 0.1mM PAT, 1.0mM DA, 0.1 mM UA and 1.0mM AA.

## References

- 1 B. Zhang, Q. Chen, H. Tang, Q. Xie, M. Ma, L. Tan, Y. Zhang and S. Yao, *Colloids & Surfaces B Biointerfaces*, 2010, **80**, 18-25.
- 2 J.S. Choi, K. Nam, J. y. Park, J. B. Kim, J. K. Lee and J. S. Park, *Journal of Controlled Release*, 2004, **99**, 445-456.