Supplementary Information

In-situ polymerization confining synthesis of ultrasmall $MoTe_2$ nanoparticles for electrochemical detection of dopamine

Yuting Du, Linxiu Dai*, Fan Yang, Yue Zhang, Changhua An*

Tianjin Key Laboratory of Organic Solar Cell and Photochemical Conversion, School of Chemistry and Chemical Engineering, Life and Health Intelligent Research Institute, Tianjin University of Technology, Tianjin 300384, China
Email: linxiudai@163.com; anchua@ustc.edu

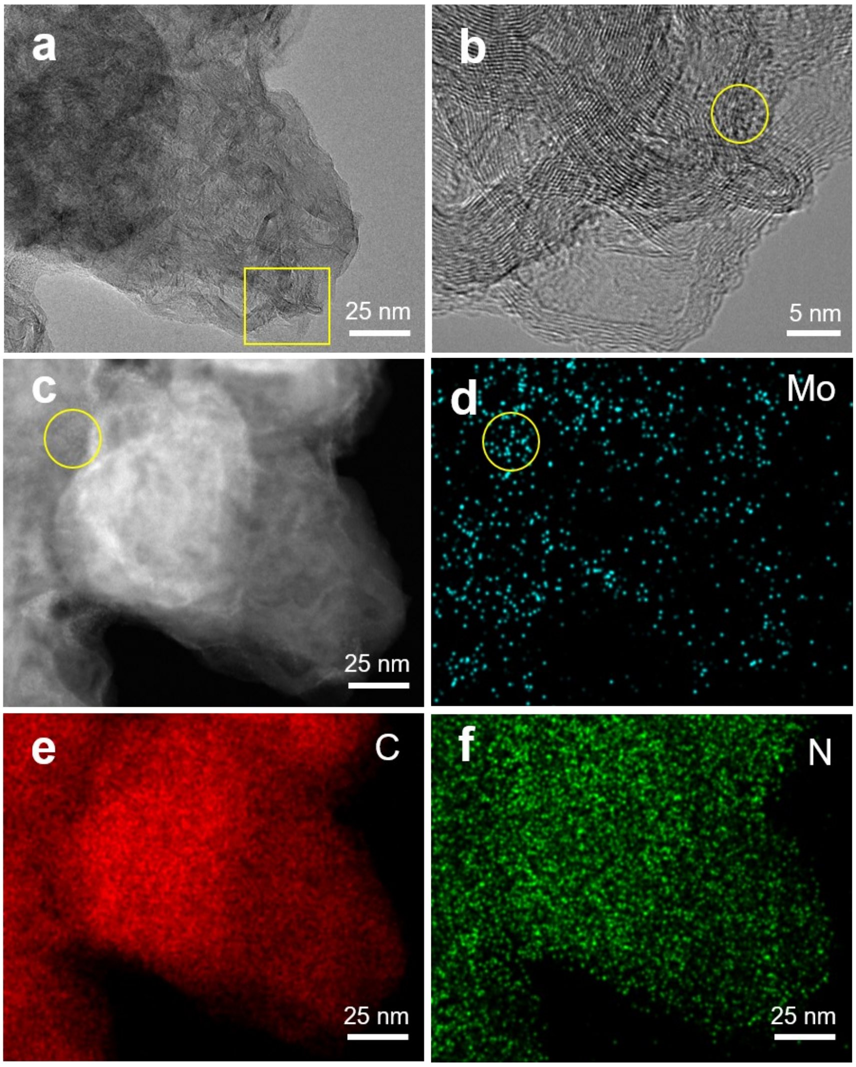

Fig. S1. Structural characterization of the as-obtained Mo@PPy/C. (a-b) TEM and HRTEM images (the inset shows the SAED pattern); (c-f) Element mapping images.

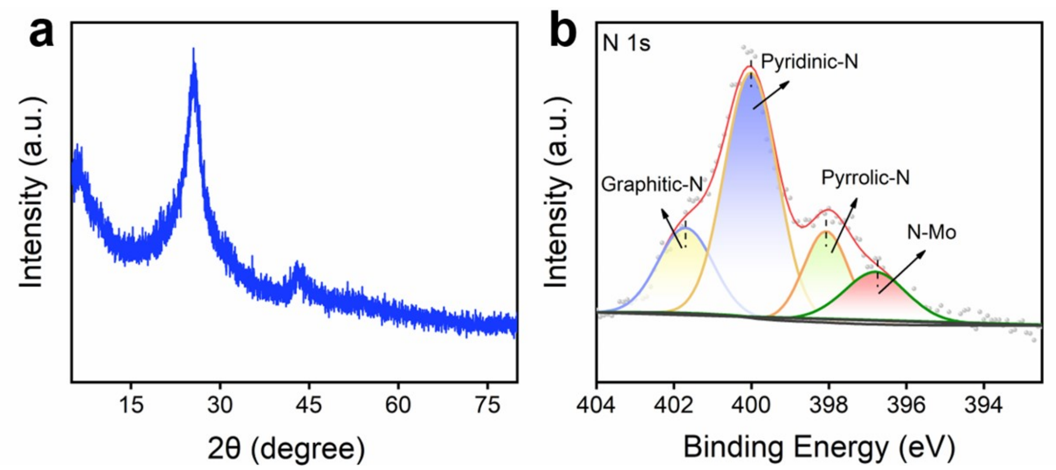

Fig. S2. (a) XRD pattern of Mo/PPy/C; (b) High-resolution XPS spectra of N elements in Mo/PPy/C.

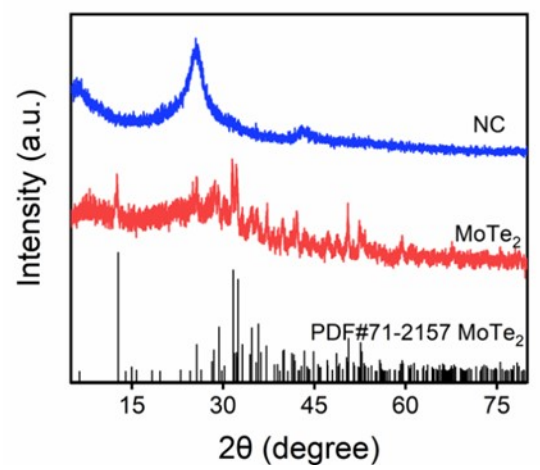

Fig. S3. XRD pattern of NC and bulk $MoTe_2$.

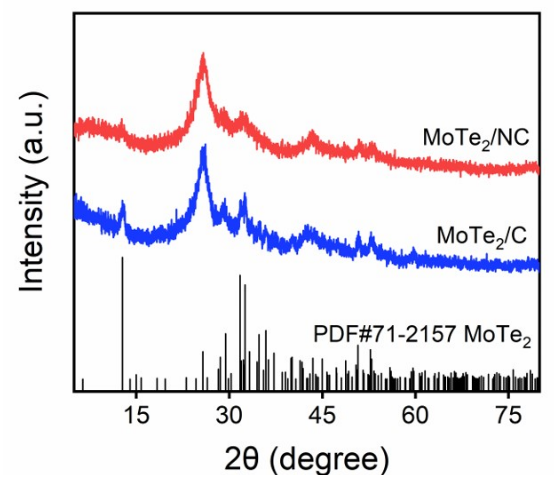

Fig. S4. XRD patterns of $MoTe_2$/NC and $MoTe_2$/C.

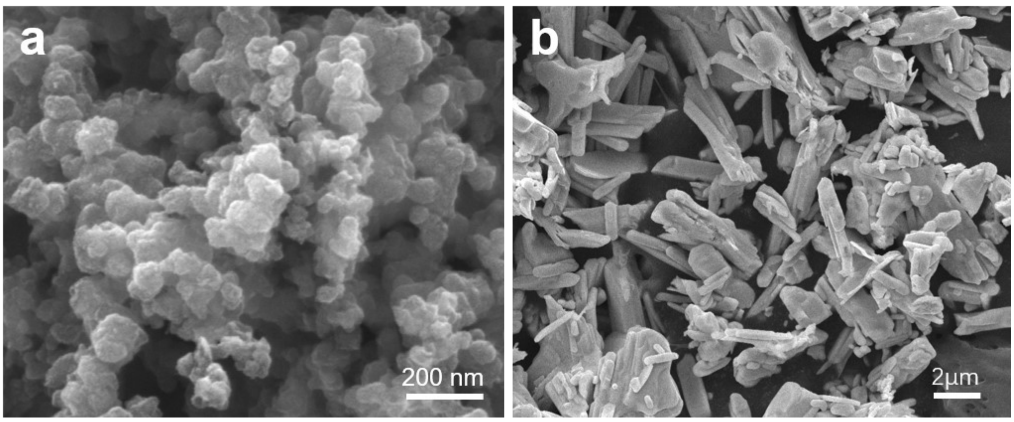

Fig. S5. High and low-magnification (inset) SEM images (a) NC and (b) bulk $MoTe_2$.

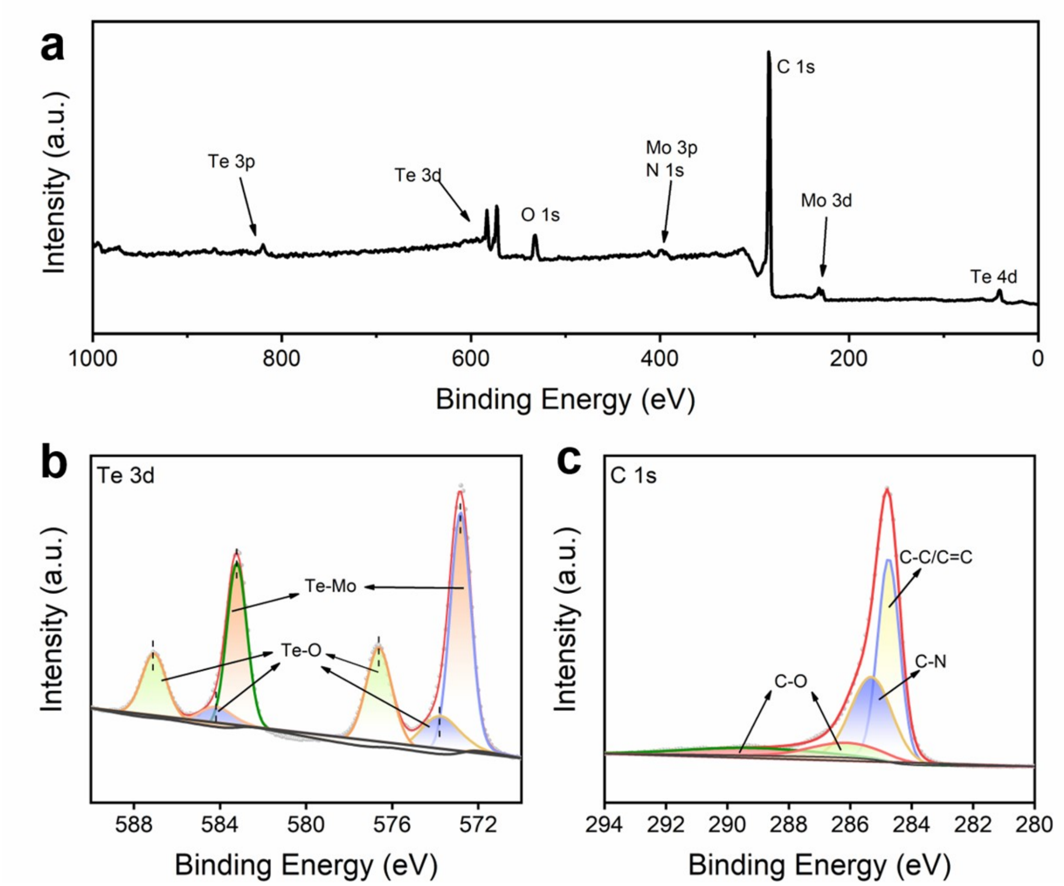

Fig. S6. High-resolution XPS of the total and respective elements in $MoTe_2$/NC. (a) Survey spectrum; (b) Te 3d; (c) C 1s.

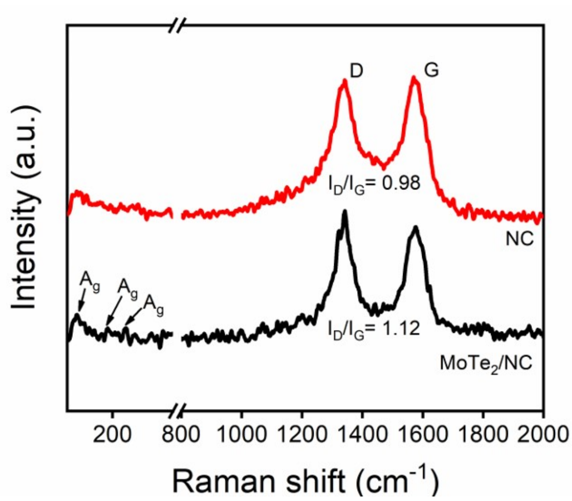

Fig. S7. Raman spectra of $MoTe_2$/NC and NC.

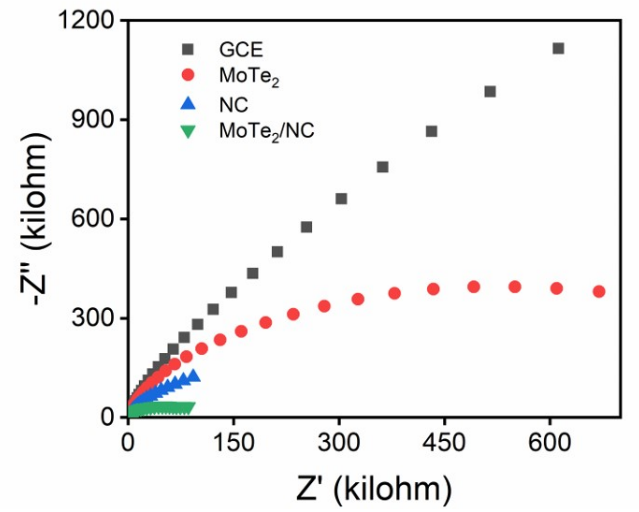

Fig. S8. EIS of different modified electrodes.

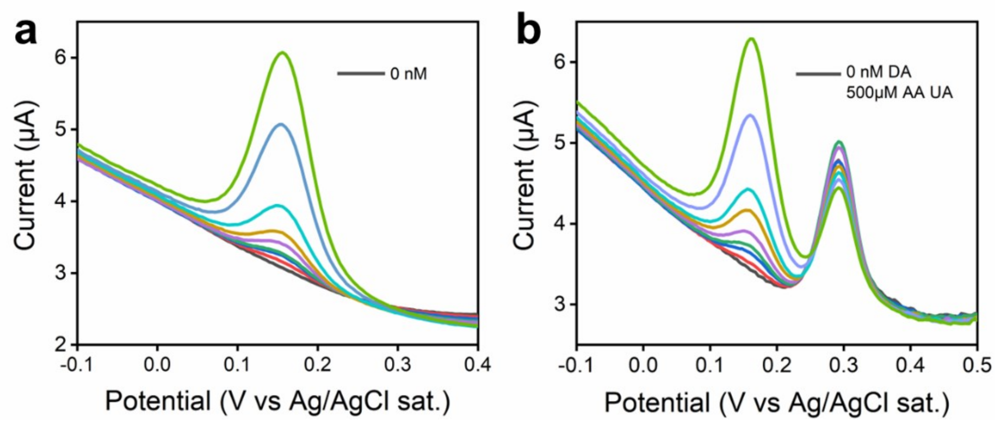

Fig. S9. (a) An enlarged image of Fig. 4a; (b) An enlarged image of Fig. 5b.

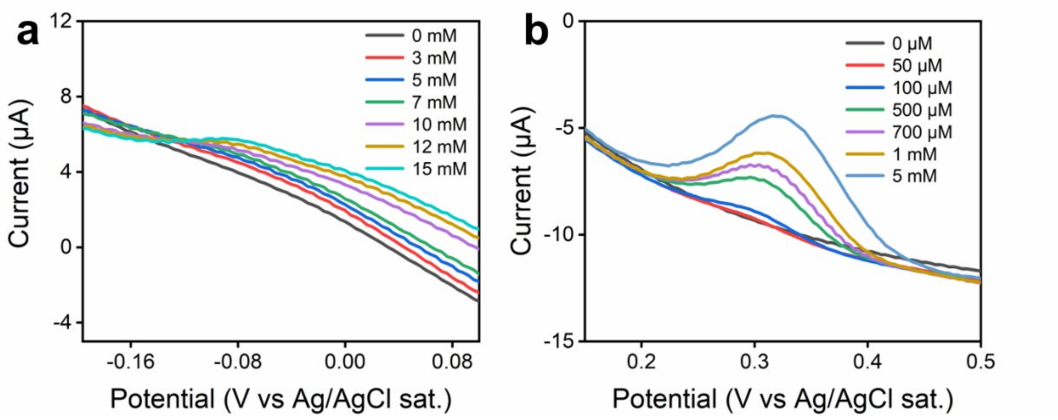

Fig. S10. DPV curves over $MoTe_2$/NC for the detection of AA (a) and UA (b) under different concentrations.

Table S1. Performance comparisons with reported materials for detection of DA.

Materials	Linear detection range (μM)	LOD (μM)	References
MoS_2 NSs/N-Gr/GCE	3.2-5680	11.9	[1]
rGO-Co_3O_4/GCE	0-30	0.277	[2]
RGO-ZnO/GCE	1-70	0.33	[3]
Graphene/Pt-modified GCE	0.03-8.13	0.03	[4]
S-$MoSe_2$/NSG/Au/MIPs	0.05-1110	0.02	[5]
Ag-Pt/pCNFs	100-500	0.11	[6]
Boron-CNT/GCE[d]	0.02-75	0.0014	[7]
Pt/MWCCNT/GCE	0.061-7.03	0.028	[8]
Nafion/Te NWs/GCE	0.005-1.0	0.001	[9]
$MoTe_2$/NC/GCE	0.1-50	0.007	This work

References

1. L. G. Bach, D. M. Nguyen, Q. B. Bui, P. H. Ai-Le and H. T. Nhac-Vu, *Mater. Chem. Phys.*, 2019, **236**, 121814.
2. A. Numan, M. M. Shahid, F. S. Omar, K. Ramesh and S. Ramesh, *Sens. Actuators, B*, 2017, **238**, 1043-1051.
3. X. Zhang, Y. Zhang and L. Ma, *Sens. Actuators, B*, 2016, **227**, 488-496.
4. C.-L. Sun, H.-H. Lee, J.-M. Yang and C.-C. Wu, *Biosens. Bioelectron.*, 2011, **26**, 3450-3455.
5. Y. Zang, J. Nie, B. He, W. Yin, J. Zheng, C. Hou, D. Huo, M. Yang, F. Liu, Q. Sun, Y. Qin and H. Fa, *Microchem. J.*, 2020, **156**, 104845.
6. Y. Huang, Y.-E. Miao, S. Ji, W. W. Tjiu and T. Liu, *ACS Appl. Mater. Interfaces*, 2014, **6**, 12449-12456.
7. C. Deng, J. Chen, M. Wang, C. Xiao, Z. Nie and S. Yao, *Biosens. Bioelectron.*, 2009, **24**, 2091-2094.
8. Z. Dursun and B. Gelmez, *Electroanalysis*, 2010, **22**, 1106-1114.
9. H. Tsai, Z. Lin and H. Chang, *Biosens. Bioelectron.*, 2012, **35**, 479-483.