## A Hybrid System Integrating Xylose Dehydrogenase and NAD<sup>+</sup> coupled with PtNPs@MWCNTs Composite for Real-Time Biosensing of Xylose

Haiyan Song<sup>a,#</sup>, Guangheng Gao<sup>b,#</sup>, Chunling Ma<sup>a,#</sup>, Yunjie Li<sup>a</sup>, Jianguo Shi<sup>b</sup>, Xigui Zhou<sup>a</sup>, Zhiguang Zhu<sup>a,c,\*</sup>

<sup>a</sup> Tianjin Institute of Industrial Biotechnology, Chinese Academy of Sciences, 32 West Seventh Avenue, Tianjin Airport Economic Area, Tianjin, 300308, P. R. China

<sup>b</sup> Biology Institute, Qilu University of Technology (Shandong Academy of Sciences), Key Laboratory for Biosensors of Shandong Province, 3501 Daxue Road, Changqing District, Jinan, Shandong, 250353, P. R. China

<sup>c</sup> School of Chemical Engineering, University of Chinese Academy of Sciences, 19A Yuquan Road, Shijingshan District, Beijing, 100049, P. R. China

#Equal contribution

\*Corresponding Author: Zhiguang Zhu (zhu\_zg@tib.cas.cn), ORCID: 0000-0002-6625-5087 Tel: (+86)-022-2482 8797; Fax: (+86)-022-8486 1926



Figure S1. Preparation of the hybrid system.



**Figure S2.** Simplified system schematic of the portable biosensor. (a) Human-computer interaction interface; (b) Serial communication module; (c) 32Bits arm processor; (d) Digital/analog conversion; (e) Control analog/digital conversion; (f) Working circuit; (g) Control circuit.



Figure S3. (a) SDS-PAGE analysis of XDH; (b) Steady-state kinetic assay of XDH for NAD<sup>+</sup>;(c) Steady-state kinetic assay of XDH for xylose.