

## Supporting information

Nitrogen-doped porous graphene as a highly efficient cathodic electrocatalyst for aqueous organic redox flow battery application

Jianyu Cao <sup>a</sup>, Zhentao Zhu <sup>a</sup>, Juan Xu <sup>a,\*</sup>, Meng Tao <sup>a</sup>, and Zhidong Chen <sup>b,\*</sup>

<sup>a</sup> *Jiangsu Key Laboratory of Advanced Catalytic Materials and Technology, School of Petrochemical Engineering, Changzhou University, Changzhou 213164, China*

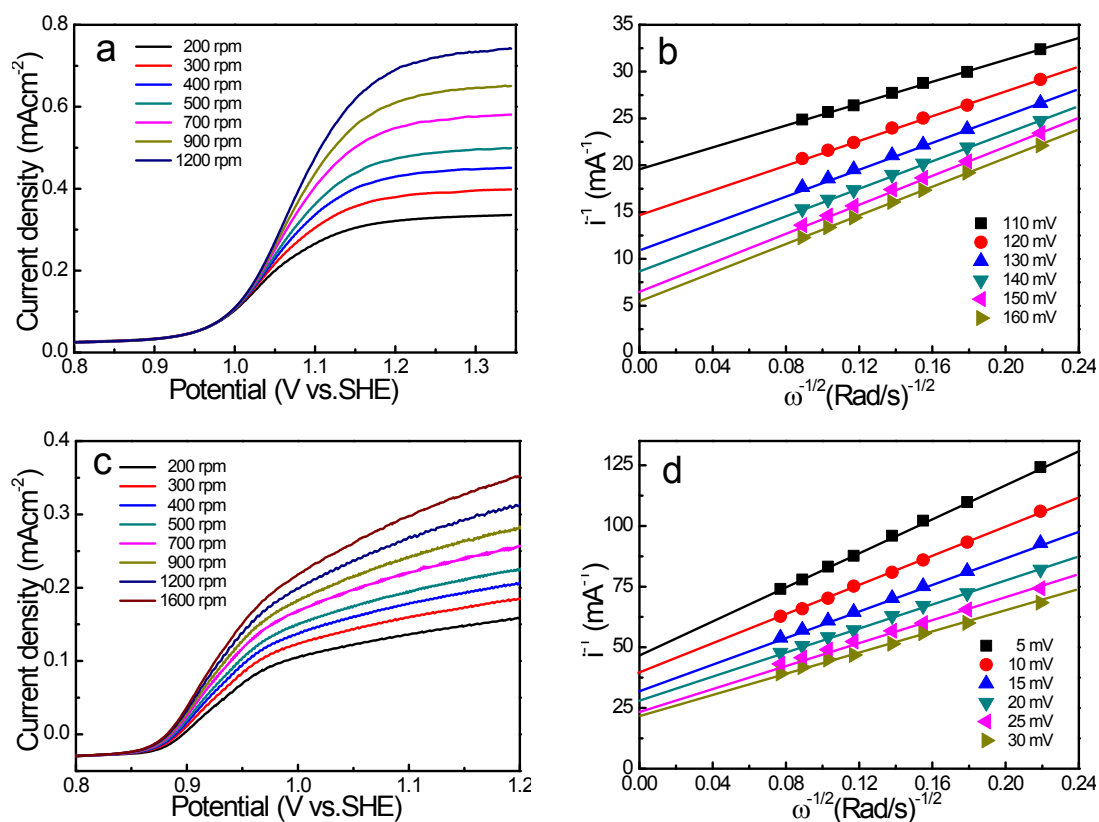
<sup>b</sup> *Jiangsu Key Laboratory of Materials Surface Science and Technology, Jiangsu Collaborative Innovation Center of Photovoltaic Science and Engineering, School of Materials Science and Engineering, Changzhou University, Changzhou 213164, China*

\*Corresponding author,

Tel. & Fax: +86-0519-86330239

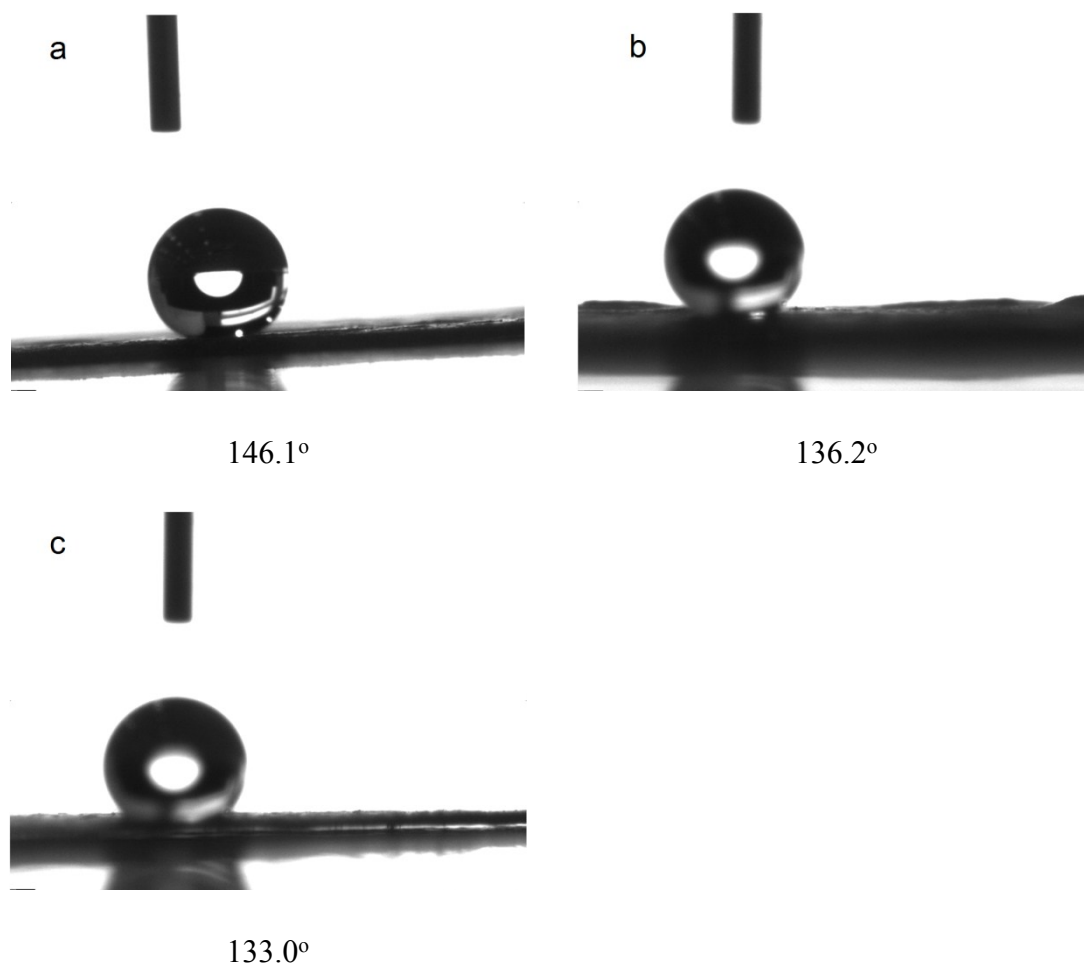
E-mail: [cjytion@cczu.edu.cn](mailto:cjytion@cczu.edu.cn) (J. Xu); [zdchen.lab@hotmail.com](mailto:zdchen.lab@hotmail.com) (Z. Chen)

**Figure S1**



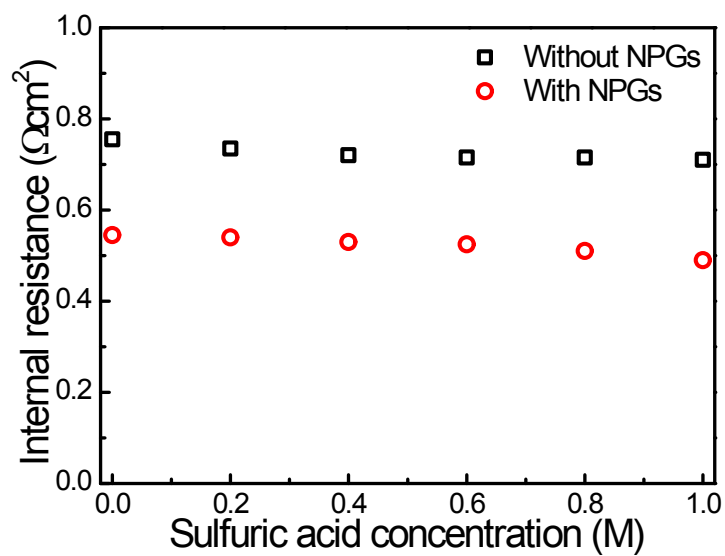
**Fig. S1** Rotating disk electrode (RDE) measurements of 1 mM BQDSH<sub>2</sub> in 1 M H<sub>2</sub>SO<sub>4</sub> on glassy carbon (a) and NPGs (c) electrode, respectively, at different rotation rates. Koutecky-Levich plot derived from RDE data of glassy carbon (b) and NPGs (d) electrode, respectively, at six different BQDSH<sub>2</sub> oxidation overpotentials.

**Figure S2**



**Fig. S2** The contact angles of water distributed on different cathodes. (a) Vulcan XC72R carbons coating on Toray carbon paper, (b) NPGs coating on Toray carbon paper, and (c) bare Toray carbon paper.

**Figure S3**



**Fig. S3** Internal resistance versus the concentration of sulfuric acid added in the catholyte for the AQDS/BQDS RFB with and without NPGs at the operating temperature of 35 °C.