Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Nitrogen-doped carbon decorated 3D $NiCoSe_2$ micro-flower as high-performance anode materials for lithium-ion batteries

Jing Xu [a, c], Lingling Xie [b, c, *], Yu Niu [a, c], Honghua Chen [a, c], Yuhan Zhang [a, c], Yubin Jiang [a, c], Qing Han [a, c], Xuejing Qiu [b, c], Yongxia Miao [a, c], Limin Zhu [a, c, *], Xiaoyu Cao [a, c, *]

[a] *School of Chemistry and Chemical Engineering*, *Henan University of Technology*, *Zhengzhou 450001*, *PR China*

[b] *School of Environmental Engineering*, *Henan University of Technology*, *Zhengzhou 450001*, *PR China*

[c] *Key Laboratory of High Specific Energy Materials for Electrochemical Power Sources of Zhengzhou City*, *Zhengzhou 450001*, *PR China*

* Corresponding author

E-mail address: caoxy@haut.edu.cn (X. Cao), linglingxie@haut.edu.cn (L. Xie), lmzhu@haut.edu.cn (L. Zhu)

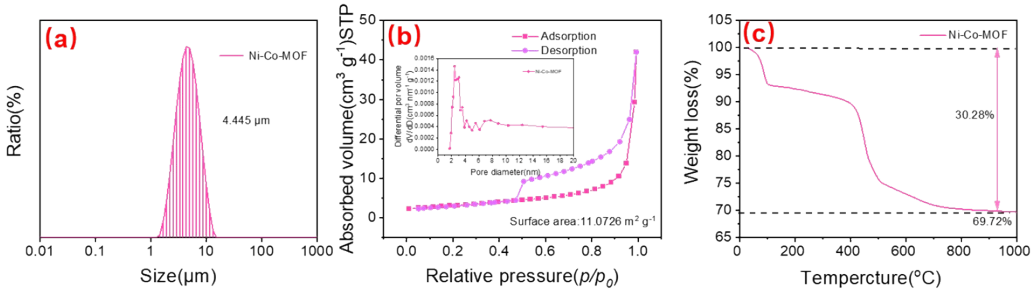

Figure S1. (a) Laser particle size analysis Atlas; (b) Nitrogen isothermal adsorption-desorption curve and pore size distribution diagram of Ni-Co-MOF; (c) Thermogravimetric analysis of Ni-Co-MOF.

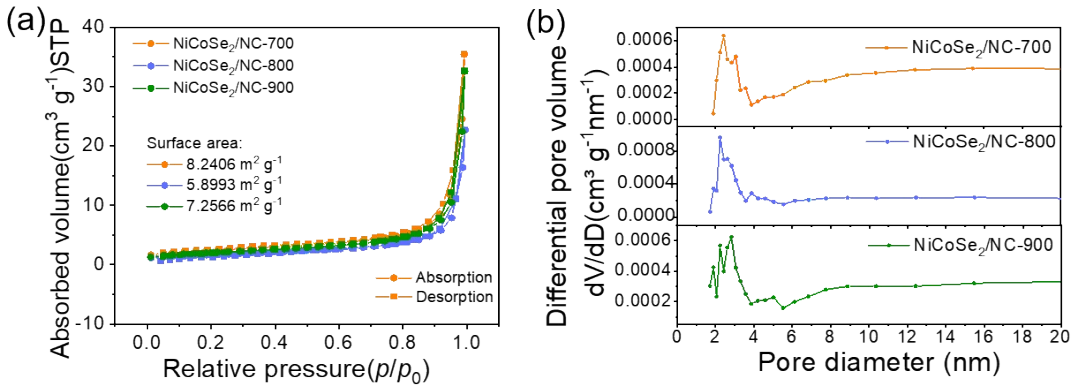

Figure S2. (a) N_2 isothermal adsorption curves and (b)pore size distribution curves of $NiCoSe_2$/NC-700, $NiCoSe_2$/NC-800 and $NiCoSe_2$/NC-900.

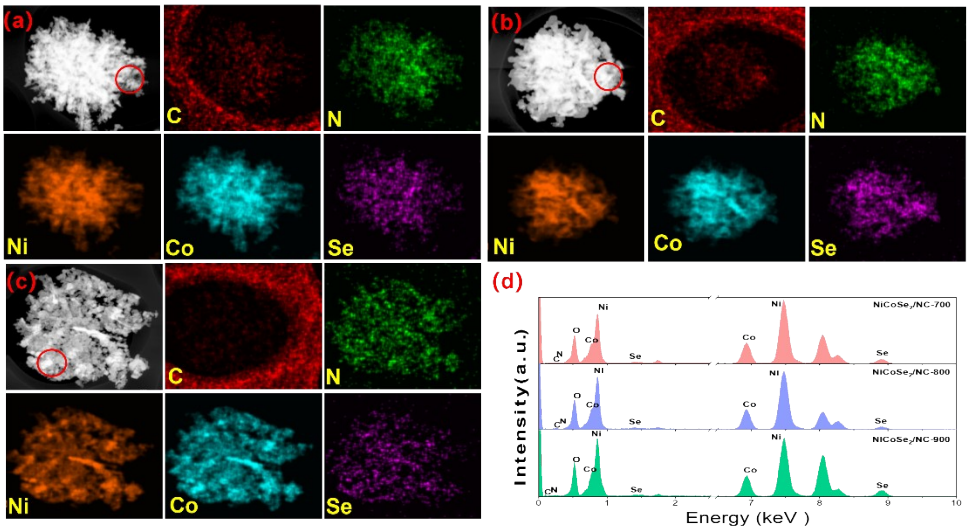

Figure S3. Mapping diagrams of $NiCoSe_2$/NC-700 (a), $NiCoSe_2$/NC-800 (b) and $NiCoSe_2$/NC-900 (c) composites (the red circles were the test area of EDS), (d) EDS of $NiCoSe_2$/NC composites.

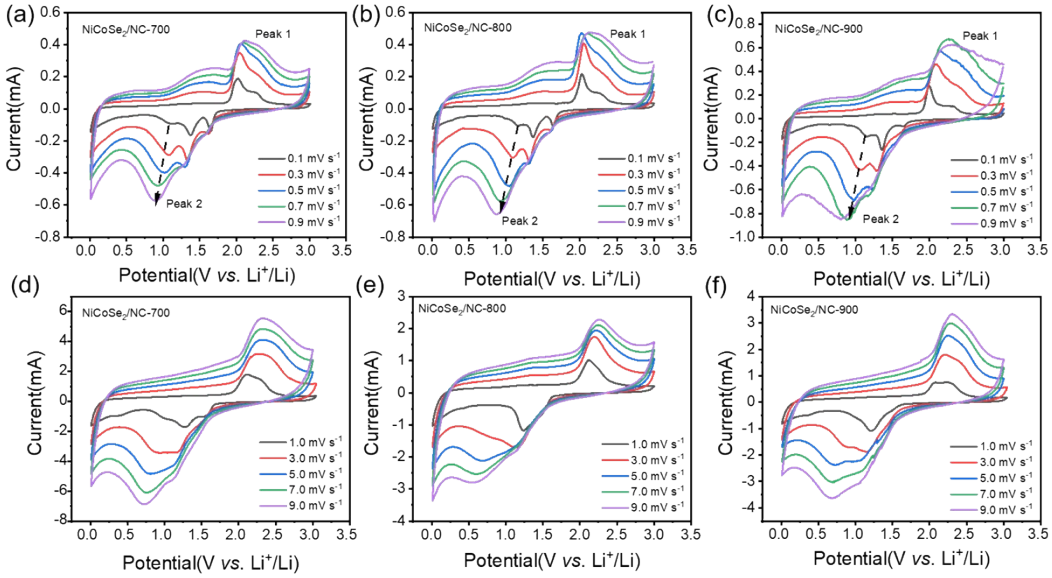

Figure S4. CV curves of (a), (d) $NiCoSe_2$/NC-700, (b), (e) $NiCoSe_2$/NC-800, and (c), (f) $NiCoSe_2$/NC-900 at different scanning speeds.

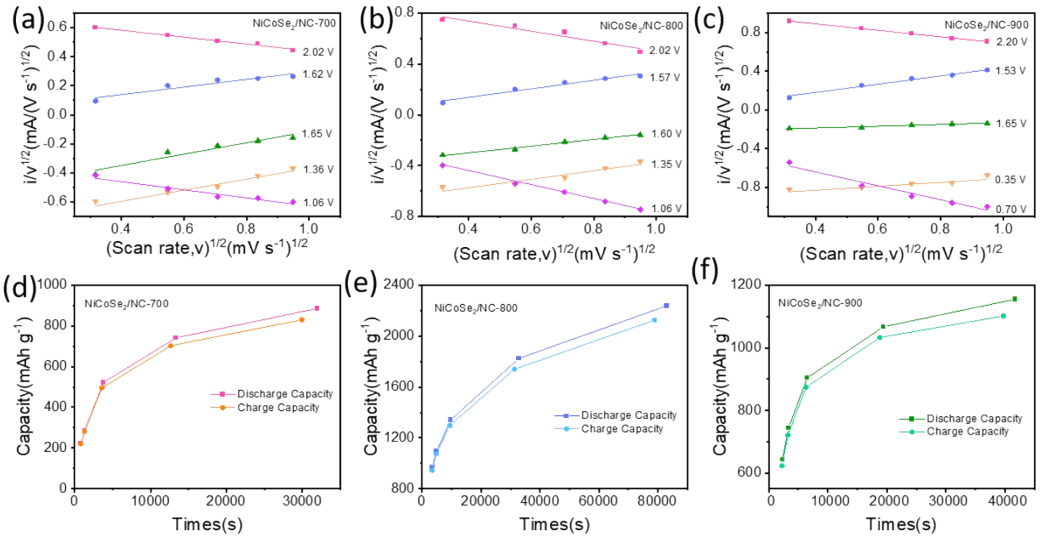

Figure S5. (a-c) Linearly fitted $i/v^{1/2}$ and $v^{1/2}$ of the three composites at different redox potentials; (d-f) the relationship between cycle time and charging and discharging capacity of three composites.