# Supporting Information

# *In-situ* Electrochemical Synthesis of Novel Lithium-rich Organic Cathode for All-organic Li-ion Full Batteries

*Yang Hu[1+], Wu Tang[1+], Qihang Yu[1+], Chuluo Yang[2] and Cong Fan[1]**

1. School of Materials and Energy, University of Electronic Science and Technology of China (UESTC), Chengdu 611731, P. R. China

**E-mail**: fancong@uestc.edu.cn

2. Shenzhen Key Laboratory of Polymer Science and Technology, College of Materials Science and Engineering, Shenzhen University, Shenzhen 518060, P. R. China

[+] These authors contributed equally to this work

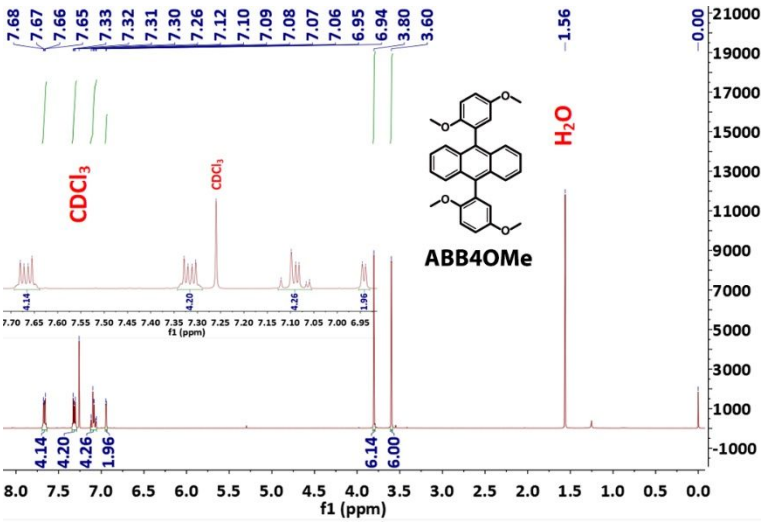


**Figure S1.** [1]H NMR spectrum of anthracene-9,10-bis(2-benzene-1,4-dimethoxy) (ABB4OMe).

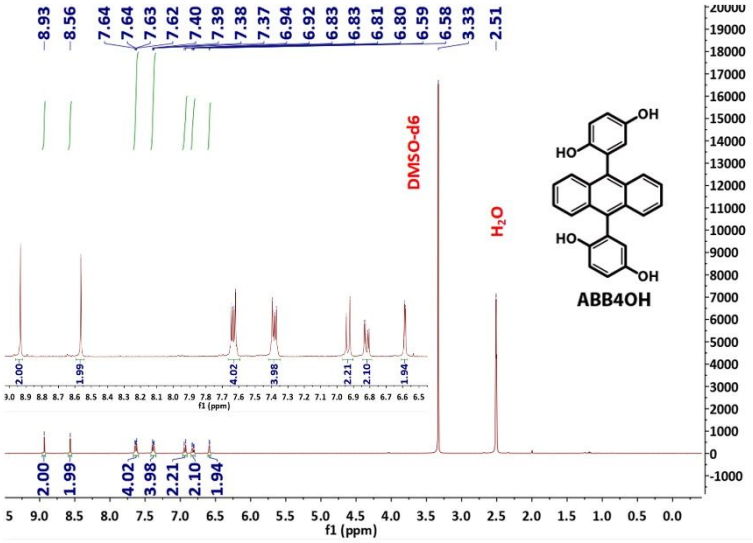


**Figure S2.** [1]H NMR spectrum of anthracene-9,10-bis(2-benzene-1,4-diol) (ABB4OH).

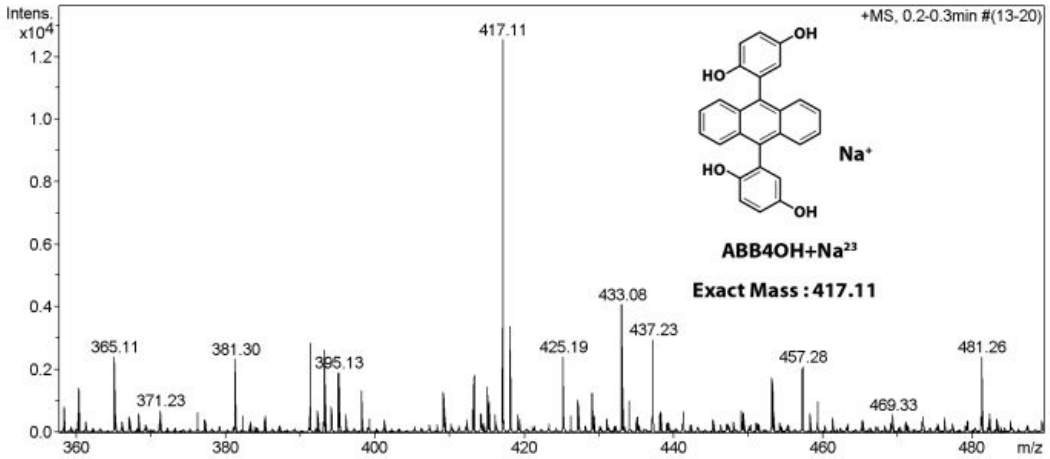


**Figure S3.** The mass spectrum of anthracene-9,10-bis(2-benzene-1,4-diol) (ABB4OH).

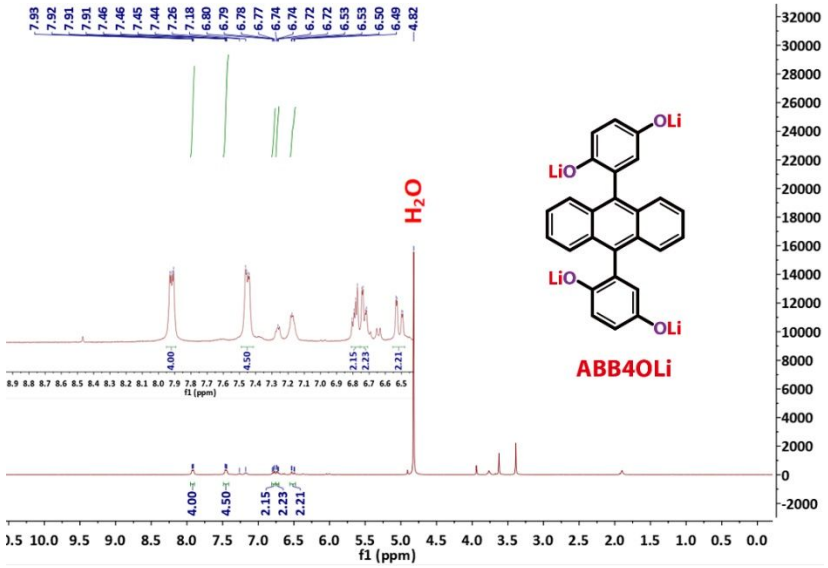


**Figure S4.** $^{1}$H NMR spectrum of lithium anthracene-9,10-bis[2-benzene-1,4-bis(olate)] (ABB4OLi).

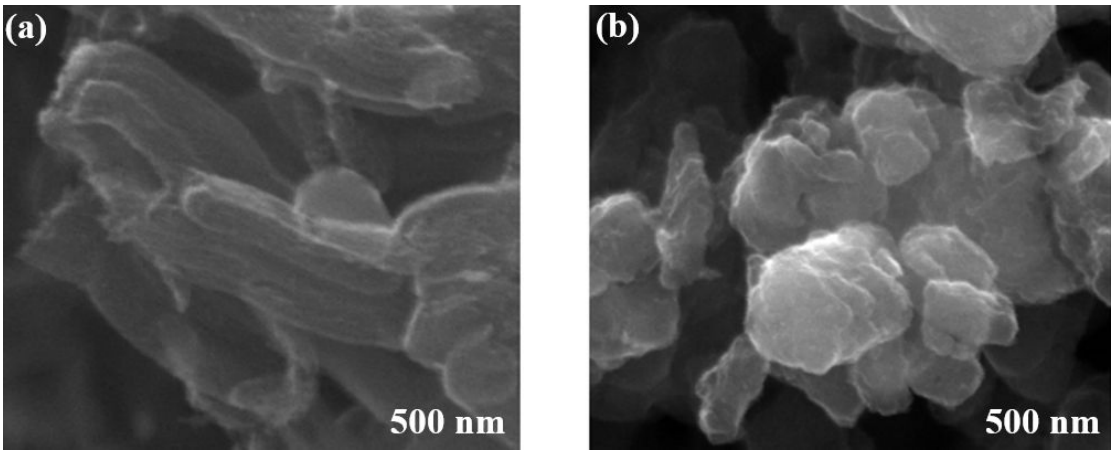


**Figure S5.** The SEM images of (a) pure CMK-3 and (b) ABB4OH/CMK-3 composite.

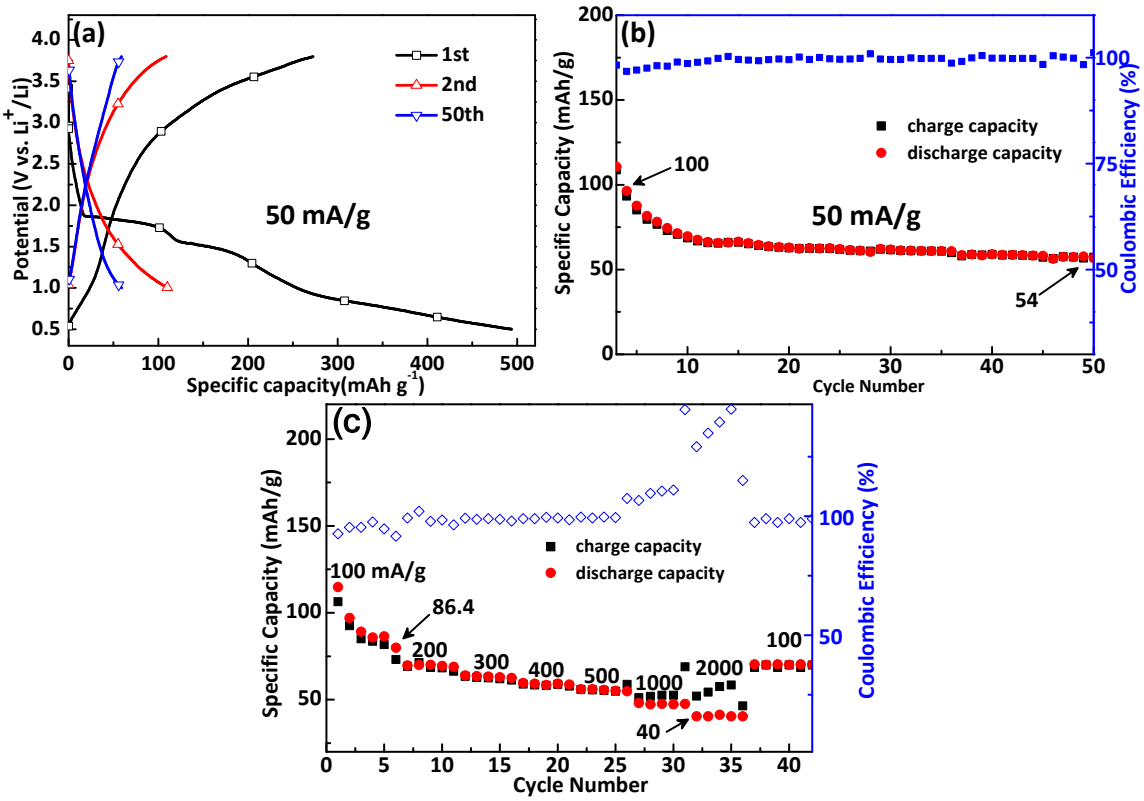


**Figure S6.** (a) The charge-discharge curves of CMK-3/SP (w:w=4:1) electrode; (b) The initial 50 cycles (except 1st cycle) of CMK-3/SP (w:w=4:1) electrode at the current density of 50 mAh $g^{-1}$(c) The rate performance of pure CMK-3/SP (w:w=4:1) electrode.

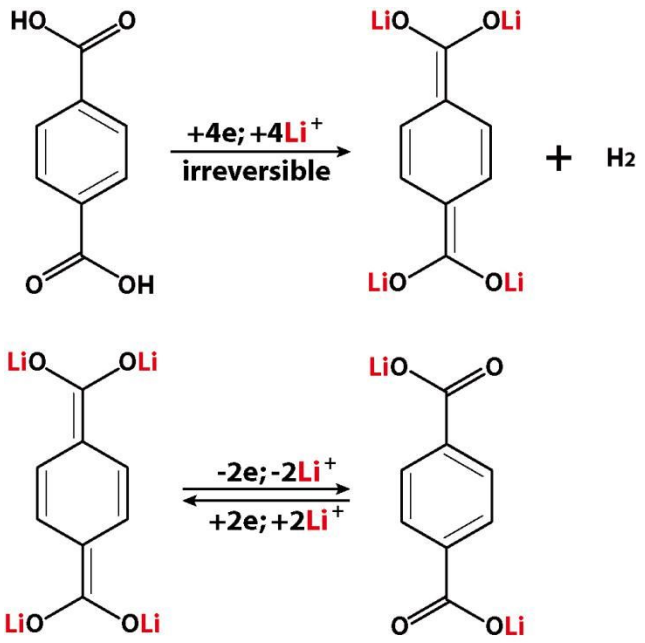


**Figure S7.** The detailed mechanism of $H_2TP$ in Li-ion half cells.

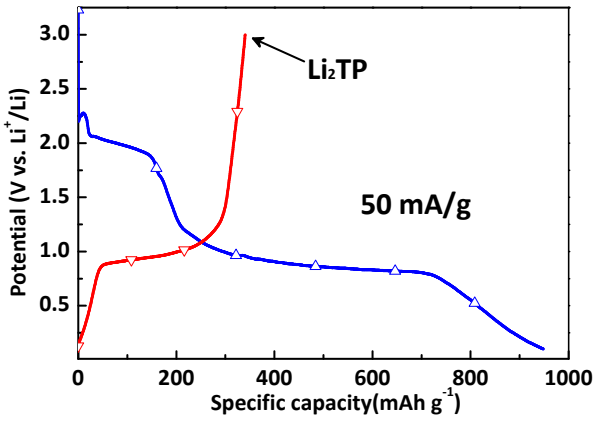


**Figure S8.** The discharge-charge curve of $H_2TP$ in Li-ion half cells.