Supplementary Information (SI) for Journal of Materials Chemistry A.

Supporting Information

Methyl Propionate–Dominant Electrolyte for Enhanced Kinetics and Low-Temperature Performance of Prussian Blue Analogue Rechargeable Sodium-Ion Batteries

Qiancheng Du, Jiaqi Sun, Varun Kumar Singh, Dhinesh Subramanian, Yanbo Zhang,

Huarong Zhang,* Yang Zhang *

School of Physics and Electronics, Henan University, Kaifeng, Henan 475004, China

*Corresponding authors.

E-mail: zhanghr@henu.edu.cn (H. Zhang); yzhang@henu.edu.cn (Y. Zhang)

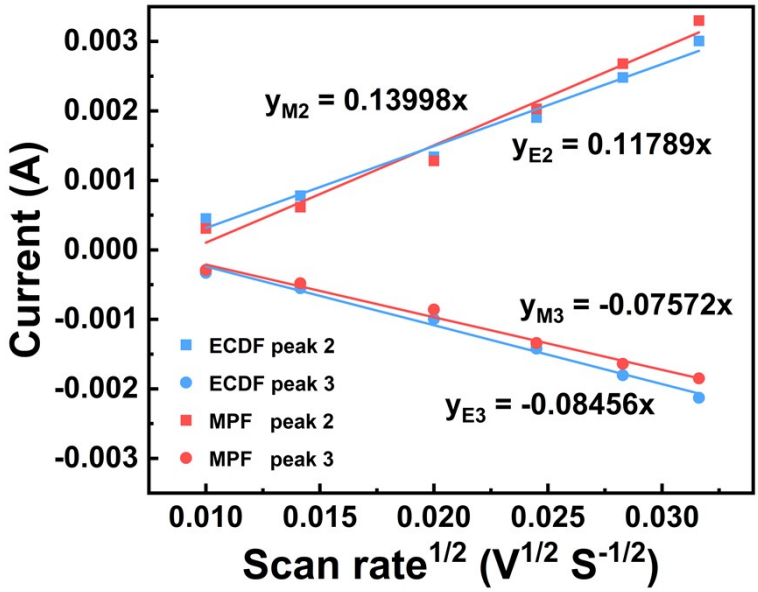

Fig. S1. PBA|ECDF|Na and PBA|MPF|Na half-cells linear relationship between current and v1/2 (scan rate)

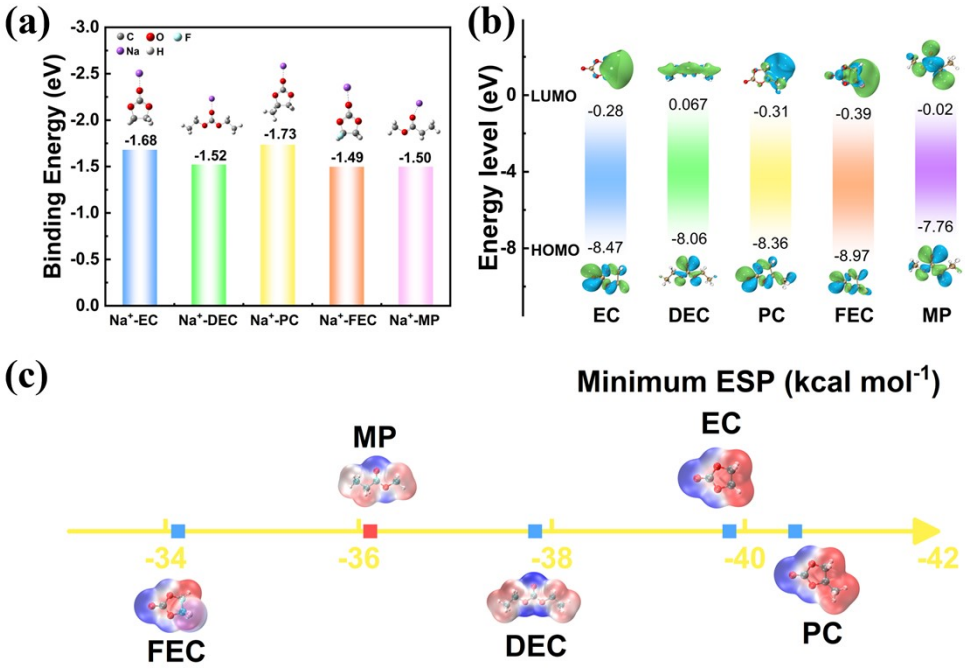

Fig. S2. DFT calculations. (a) Binding energies and corresponding structural models of different solvents with Na^+. (b) HOMO and LUMO energy levels of different solvents. (c) ESP_{min} values of various solvents.

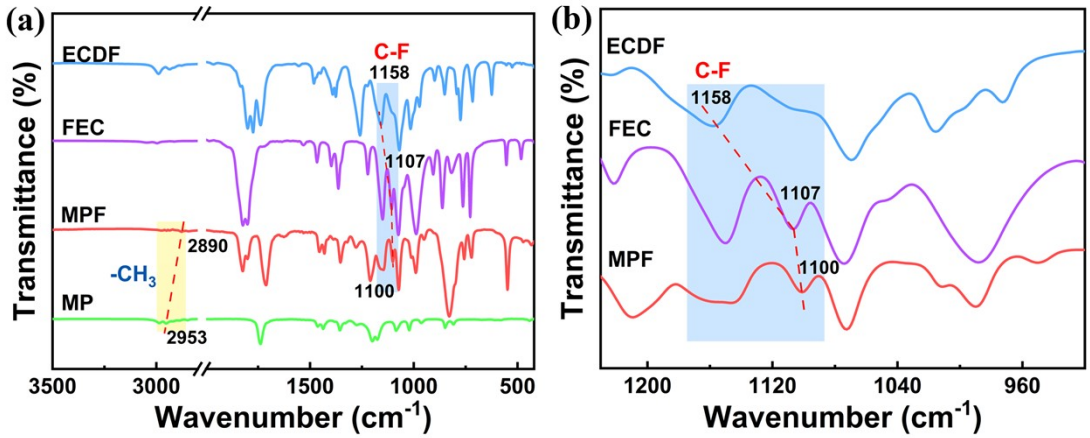

Fig. S3. (a) FTIR spectra of individual solvents and their various combinations, and (d) their local enlarged view.

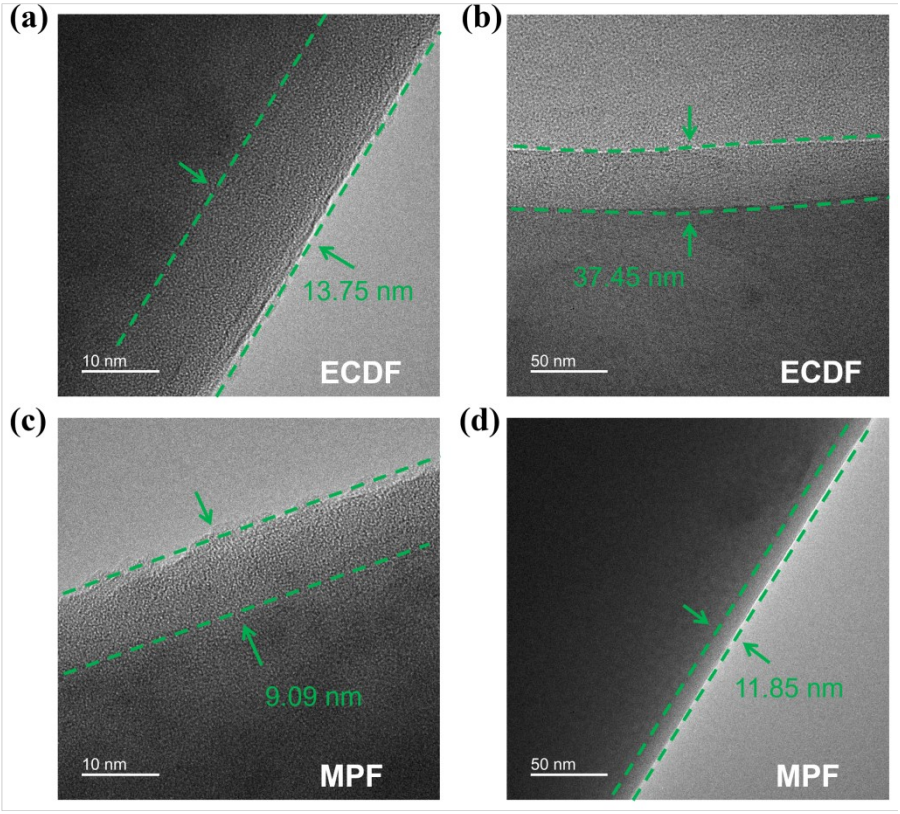

Fig. S4. TEM image of cycled PBA cathode in (a, b) ECDF electrolyte and (c, d) MPF electrolyte.

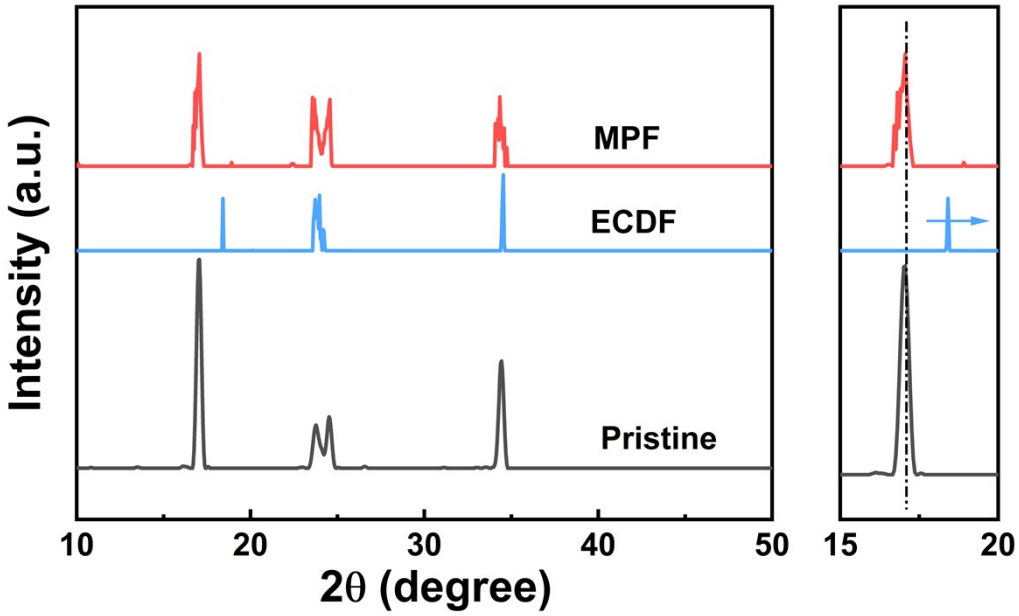

Fig. S5. Comparison of XRD patterns for the PBA cathode in its initial state and after cycling.

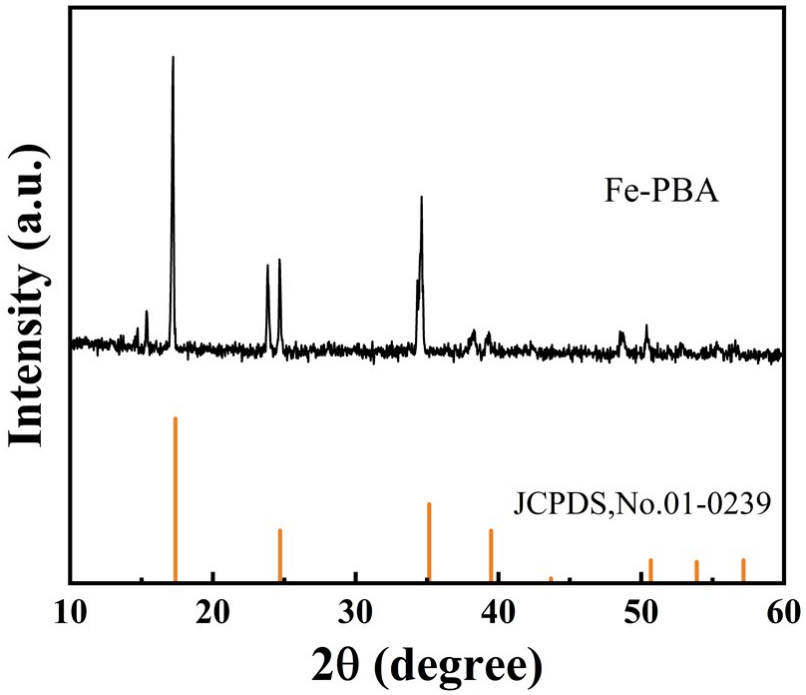

Fig. S6. XRD pattern of the as-synthesized Fe-PBA cathode material.

Table S1 Electrochemical properties of PBA-sodium-ion batteries with various designs

Electrode	Electrolyte	Specific capacity (mAh g^{-1})	Wide-Temp. Performance: Capacity retention, cycle @ C (°C)	Ref.
PBA||Na (fluorine-rich CEI)	1 M $NaPF_6$ in MP /FEC (9:1)	155 @1C	80.57%, 100@ 1C (50°C); 83.4%, 200@ 1C (25°C); 86.68%, 300@ 1C (−20°C)	This work
PBA||Na (Cs^+/Zn^{2+} co-doped)	1 M $NaClO_4$ in EC/DEC (1:1), 8% FEC	108 @5C (−20°C)	79.63%, 5400@5C (−20°C)	[1]
FePB||HC (FePB@S-CEI)	1 M $NaClO_4$ in EC/DEC (1:1), 2 % 1-propene-1,3sultone (PS)	124@0.1C	92.7%, 400@1C (0°C) 80.7%, 400@1C (60°C)	[2]
FeVO-PBA||Na	1 M $NaPF_6$ in DEG-DME	148.9@0.5C	92.6%, 400@ 5C (60°C); ~100%, 300@ 1C (−30°C)	[3]
I-PB||Na (ice-assisted)	1 M $NaClO_4$ in EC/DEC (1:1), 4% FEC	123@15 mA g^{-1}	72.6%, 100@ 150 mA g^{-1} (60°C); ~100%, 100@ 150 mA g^{-1} (−10°C)	[4]
M5-PBA||HC（M=Mn, Fe, Co, Ni, Cu）	1 M $NaClO_4$ in EC:PC:FEC (47.5 :47.5:5)	142.4@0.1C	82.9%, 500@ 1C (30°C);	[5]
M-BA||Na	1 M $NaClO_4$ in EC/DEC (1:1), 5% FEC	131.1@0.1C	94.8%, 200@ 1C (25°C)	[6]
FeNi-MnHCF||Na	1 M $NaPF_6$ in PC/EMC, 4% /FEC+1 wt% ETFA	107.1@0.1C	92.1%, 1120@(1C, 77.4 $mAhg^{-1}$ (−20°C)	[7]
$Na_2Fe[Fe(CN)_6]\cdot 2H_2O$||Na	1 M $NaPF_6$ in tetraglyme	145@0.1C	>70%, 140@30 mA g^{-1} (25°C)	[8]
NiMnFe-PBA||Na	1 M $NaClO_4$ in PC, 5% FEC	122.8@10 mA g^{-1}	71.35%, 300@100 mA g^{-1} (25°C)	[9]
NaKMHCF||Na	1 M $NaClO_4$ in PC, 5% FEC	129.3@10 mA g^{-1}	77.0%, 500@500 mA g-1 (25°C)	[10]
Zn-substituted Fe- PBA||Na	1 M $NaPF_6$ in EC/DEC (1:1)	114.56@10 mA g^{-1}	80.27%, 350@200 mA g-1 (25°C)	[11]
NaMHCF||Na	1 M $NaPF_6$ in PC/EC (1:1) ,	159.2 @0.1C	90%, 300@350 mA g-1 (25°C); 65%, 300@0.5C (−20°C)	[12]

10% FEC

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