Supplementary Information (SI) for Physical Chemistry Chemical Physics.

Supporting Information

A hydrogen bond-driven strategy with ultrasound assistance for ultrafast and efficient recovery of PVDF nanoplastic from polymer solid electrolytes of all-solid lithium-ion batteries

Xuemin Jing[a], Qianqian Liu[a], Xingyu Shi[a], Ziyi Sun[a], Zhenghui Liu[b], Zhenyang Li[c], Na Ni[c], Yu Chen[a*]

[a]*Department of Chemistry and Material Science, Langfang Normal University, Langfang 065000, Hebei, China*

[b]*School of Pharmaceutical and Chemical Engineering, Taizhou University, Taizhou 318000, Zhejiang, China*

[c]*Langfang Qingyue Environmental Technology Co., LTD, NO. 3 Huayuan Road, Economic and Technological Development Zone, Langfang 065000, Hebei, P. R. China.*

†Corresponding author: Yu Chen. Phone: +86-316-2188211; Fax: +86-316-2112462. Email: yuchen@iccas.ac.cn

Table S1. The leaching efficiency and concentration of F from PVDF nanoplastic in different leaching systems.

Value	c_F/ppm	η_F/%
DAP:EG (1:1)	11086.5263±324.6070	88.8395±2.6011
H_3PO_4:EG (1:1)	1.9191±0.0462	0.0141±0.0003
GAA:EG (1:1)	1.3272±0.1101	0.0099±0.0008
HNO_3:EG (1:1)	0.9997±1.0639	0.0072±0.0076
OA:EG (1:1)	0.6319±0.0322	0.0047±0.0002
H_2SO_4:EG (1:1)	0.5938±0.1039	0.0043±0.0007
HCl:EG (1:1)	0.4403±0.1246	0.0032±0.0009
HBr:EG (1:1)	0.2278±0.0177	0.0016±0.0001

Table S2. Comparison of five PVDF recycling methods in terms of F leaching efficiency, operating conditions, solvent recyclability, and key disadvantages.

Techniques	Removal efficiency / %	Conditions	Solvent recyclability	Disadvantage	Ref.
High-intensity ultrasonication	82+	2 5kHz, 998~1002W, 12 h	NA	Immature removal process	[1]
High-temperature calcination	85~95	400~600℃	NA	Produce poisonous gas	[2-4]
Dissolution stripping (NMP+DMSO)	90+	refluxed for 24h 200 ℃	Complex solution recovery	Highly toxic, harmful to humans and environment	[5, 6]
Fluid extraction (CO_2+DMSO)	98.5	70 °C, 80 bar, 13 min	Recyclable, Zero-loss	Complex equipment, corrosion equipment	[7]
LoMMSs (DAP:EG)	91.5	80 °C, 2 h	Green and mild	NA	This work

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