Supporting Information

Recent advances in the interface engineering of solid-state Li-ion batteries with artificial buffer layers: challenges, materials, construction, and characterization

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Table S1. Summary of artificial buffer layers (ABLs) used in solid-state Li-ion batteries.

Type	Materials	Advantages	Disadvantages	Ref.
Organic buffer layer	PEO-LiTFSI PEO-LiFTFSI CPEO-LiTFSI Li-EDA PAN-$LiPF_6$ PMA-PEO-LiTFSI HFP-PVDF-$LiPF_6$	• High flexible • Intimate physical contact with electrode materials • Low cost • High chemical stability	• Low conductivity • Relatively low oxidation voltage • Poor thermal stability and mechanical strength • Flammable	1-3 4 5 6 7 8 9
Inorganic buffer layer	Li-Au alloy Li-Ge alloy Li-In alloy Li-Al alloy Li-Si alloy Li-Sn alloy Li-C alloy Li-Mg alloy	• High mechanical strength • High chemical and electrochemical stability • Stable with lithium metal	• Poor electronic insulation • Non-flexible • Insufficient mechanical strength	10, 11 12 13 14 15, 16 17, 18 19 20, 21
	C-thin film Nb-thin film Ge-thin film Si-thin film LIPON-thin film $LiCoO_2$-thin film Li_2S-P_2S_5-thin film LLZO-thin film	• High electrochemical oxidation voltage • Stable with cathode materials • High thermal stability	• Expensive for large-scale production • Insufficient Li-ion conductivity • Poor flexible	22 23 24 25 26-28 29 30 31
	Al_2O_3 ZnO SiO_2 In_2O_5Sn (ITO) Li_2O-ZrO_2 Li_2O-B_2O_3	• High chemical and electrochemical stability • High thermal stability	• Relatively low conductivity • Non-flexible • Limited Li-ion conductivity	32-34 35, 36 37 38 39 40
	LiF Li_3N Li_2CO_3 Li_3PO_4 $LiAlO_2$ $Li_xAl_{2-x/3}O_3$ $LiNbO_3$ $LiTaO_3$ Li_2SiO_3 $Li_4Ti_5O_{12}$ $Li_{2.3-x}C_{0.7+x}B_{0.3-x}O_3$	• Stable with lithium metal • Stable with cathode materials • Sufficient Li-ion conductivity • High thermal stability	• Complicated manufacturing process • Non-flexible	41 42-44 45 46, 47 48 49 50-52 53 54-56 57, 58 59
Hybrid buffer layer	SiO_2/PEG SiO_2/PEA Al_2O_3/PEO Cu_3N/SBR LLZO/PEO MOF/Li-IL LPOS/PEO ZnO/PVDF-HFP CPMEA/Al_2O_3	• Good mechanical strength and mechanical flexibility • Good physical contact with electrode materials	• Limited thermal stability • Limited Li-ion conductivity and oxidation voltage • Expensive for large-scale production	60 61 62 63 64-66 67 68 69 70

The definition of acronyms in Table S1: poly(ethylene oxide) (denoted as PEO), cross-linked polyethylene oxide (denoted as CPEO), lithium ethylenediamine (denoted as LiEDA), polyacrylonitrile (denoted as PAN), poly(N-methyl-malonic amide) (denoted as PMA), polyethylene glycol (denoted as PEG), poly(ether-acrylate) (denoted as PEA), styrene butadiene rubber (denoted as SBR), Li^+ containing ionic liquid (denoted as Li-IL), Li_2S-P_2S_5-P_2O_5 (denoted as LPOS), cross-linked poly(ethylene glycol) methyl ether acrylate (denoted as CPMEA).

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