

## Outline

### **In Situ Polymerization Process: An Essential Design Tool for Lithium Polymer Batteries**

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3. Polymer electrolytes
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## Glossary

Acetonitrile	ACN
Addition Fragmentation Chain Transfer	RAFT
Anionic ring-opening polymerization	AROP
Atom Transfer Radical Polymerization	ATRP
Atomic layer deposition	ALD
Azobisisobutyronitrile	AIBN
Battery management system	BMS
Benzoyl peroxide	BPO
Bi-functional linear borate cross-linker	LBC
Bilayer PE	BLPE
Bisphenol A ethoxylate dimethacrylate	BEMA
Butyl acrylate	BA
Cathode electrolyte interphase	CEI
Cationic addition polymerization	CAP
Cationic ring-opening polymerization	CROP
Computer-aided design	CAD
Covalent organic framework	COF
Cyanoethyl polyvinyl alcohol	PVA-CN
Diethyl carbonate	DEC
Dimethyl carbonate	DMC
Dimethyl polyethylene glycol	DPG
Dimethyl sulfoxide	DMSO
Dimethylformamide	DMF
Direct ink writing	DIW
Dry polymer electrolyte	DPE
Electric Vehicle	EV
Electrochemical energy storage	EES
Electrochemical Impedance Spectroscopy	EIS
Ethoxylated trimethylolpropane triacrylate	ETPTA
Ethyl cyanoacrylate	ECA
Ethylene carbonate	EC
Ethylene glycol diacrylate	EGDA
Ethylene glycol phenyl ether acrylate	EGPEA
Ethylene oxide	EO
Fused deposition modeling	FDM
Gel polymer electrolyte	GPE
Glass transition temperature	$T_g$
Glutaronitrile	GN
High Surface Area Lithium	HSAL
Hybrid polymer electrolyte	HPE
Indium-tin-oxide	ITO
Infrared	IR
Inorganic solid-state electrolytes	ISEs

Internal combustion engine	ICE	
Interpenetrated network	IPN	
Ionogel PE	IGPE	
Lauryl peroxide	LPO	
LE-based primary LMB	pLMB	
LE-based rechargeable LMB	LE-LMB	
Liquid crystal polymer electrolyte	LCPE	
Liquid electrolytes	LE	
Lithium 1-[3-(methacryloyloxy)-propyl sulfonyl]-1-(trifluoromethylsulfonyl) imide		LiMTFSI
Lithium alcoholates	LiOR	
Lithium battery	LB	
Lithium bis(fluorosulfonyl)imide	LiFSI	
Lithium bis(oxalato)borate	LiBOB	
Lithium bis(trifluoromethanesulfonyl)imide	LiTFSI	
Lithium cobalt oxide	LCO (LiCoO <sub>2</sub> )	
Lithium difluoro(oxalato) borate	LiDFOB	
Lithium ethylene decarbonate	LEDC	
Lithium hexafluorophosphate	LiPF <sub>6</sub>	
Lithium iron phosphate LiFePO <sub>4</sub>	LFP	
Lithium metal batteries	LMBs	
Lithium metal polymer batteries	LMPBs	
Lithium microbatteries	mLBs	
Lithium nickel manganese oxide	LNMO	
Lithium polymer batteries	LPBs	
Lithium-intercalated graphite	LIG	
Lithium-ion batteries	LIBs	
Lithium-ion polymer batteries	LIPBs	
Lithium titanium oxide (Li <sub>4</sub> Ti <sub>5</sub> O <sub>12</sub> )	LTO	
LiNi <sub>x</sub> Co <sub>y</sub> Al <sub>z</sub> O <sub>2</sub>	NCA	
LiNi <sub>x</sub> Mn <sub>y</sub> Co <sub>z</sub> O <sub>2</sub>	NMC	
Matrix-assisted laser desorption/ionization	MALDI	
Melting point	T <sub>m</sub>	
Metal-organic framework	MOF	
Methyl benzoylformate	MBF	
Methyl ethylene carbonate	MEC	
Methyl methacrylate	MMA	
Microstereolithography	μSLA	
Molecular weight	M <sub>n</sub>	
N,N-dimethylacetamide	DMAC	
N-methoxyethyl-N-methylpyrrolidinium bis(trifluoromethanesulfonyl)imide		PY <sub>1201</sub> -TFSI-RTIL
N-methyl pyrrolidone	NMP	
Nuclear magnetic resonance	NMR	
o-hydroxybenzenesulfonate	o-HBS	
Oligoethylene glycol borate	OEGB	
Pentaerythritol tetra (3-mercaptopropionate)	PETMP	
Pentaerythritol tetraacrylate	PETEA	

p-hydroxybenzenesulfonate	p-HBS
Plastic crystal polymer electrolyte	PCPE
Plastic lithium-ion battery	PLiON
Poly(diethylene glycol carbonate) dimethacrylate	PDEC-DMA
Poly(ethylene glycol) acrylate	PEGA
Poly(ethylene glycol) diacrylate	PEGDA
Poly(ethylene glycol) diglycidyl ether	PEGDE
Poly(ethylene glycol) dimethacrylate	PEGDMA
Poly(ethylene glycol) methyl ether methacrylate	PEGMEM
Poly(ethylene glycol)	PEG
Poly(methyl methacrylate)	PMMA
Poly(propylene oxide) diacrylate	PPOD
Poly(vinyl acetate)	PVAc
Poly(vinyl ethers)	PVEs
Poly(vinylene carbonate)	poly-VC
Poly(vinylidene difluoride)	PVdF
Poly(vinylidene difluoride-co-hexafluoropropylene)	PVdF-HFP
Poly-2,6-dimethyl-1,4-phenylene oxide	PDPO
Poly-4-sulfonic acid-1,2-phenylene oxide	PSPO
Polyacrylonitrile	PAN
Polyethylene oxide	PEO
Polyethylene terephthalate	PET
Polyisobutylene	PIB
Polymer composite electrolyte	PCE
Polymer composite electrolyte	PCE
Polymer electrolyte	PE
Polymer nano-composite electrolyte	PNCE
Polymeric ionic skin	PIS
Polystyrene-b-polybutadiene-b-polystyrene	SBS
Polystyrene-b-polybutadiene-b-polystyrene	SBS
Propylene carbonate	PC
Repeating units	RU
Ring-opening polymerization	ROP
Room temperature	RT
Room-temperature ionic liquid	RTIL
Scanning electron microscopy	SEM
Selective laser sintering	SLS
Semi- interpenetrated network	s-IPN
Silicon-graphene composite anode	Si-FLG
Single-ion conducting polymer electrolyte	SIC-PE
Sodium saturated calomel electrode	SSCE
Solid electrolyte interphase	SEI
Solid polymer electrolyte	SPE
Solid-state electrolytes	SSEs
Stereolithography	SLA
Styrene-butadiene rubbers	SBR

Succinonitrile	SN
t-amyl peroxyvalate	TAPP
t-butyl peroxyvalate	TBPP
Teflon	PTFE
Tetrahydrofuran	THF
Thermogravimetric mass-spectrometry	TG-MS
Transition metal oxide	TMO
Tri (ethylene glycol) divinyl ether	TEGDVE
Tri propylene glycol diacrylate	TPGDA
Triethylamine	TEA
Triethylene glycol diacrylate	TEGDA
Tri-functional branched borate cross-linker	TBC
Trimethyl borate	TMB
Trimethylolpropane triacrylate	TMPTA
Trimethylolpropane trimethylacrylate	TMPTMA
Tris(2-(acryloyloxy) ethyl) phosphate	TAEP
Ultraviolet	UV
Underpotential electropolymerization	UPE
Vinyl ethylene carbonate	VEC
Vinylene carbonate	VC
X-ray diffraction	XRD
X-ray photoelectron spectroscopy	XPS
1,1-carbonyldiimidazole	CDI
1,2-dimethoxyethane	DME
1,2-dioxolane	1,2-DOL
1,3-butanediol diacrylate	BDDA
1,3-diallyl imidazolium perchlorate	DAIM
1,3-dioxolane	1,3-DOL
1,8-diazabicyclo [5.4.0] undec-7-ene	DBU
1-allyl-3-methylimidazolium perchlorate	AMIM
1-allyl-3-vinyl imidazolium perchlorate	AVIM
1-butyl-3-(2-methacryloyloxyhexyl) imidazolium bis(trifluoromethane sulphonyl) imide	MHBIIm-TFSI
1-methyl-3-(2-acryloyloxyhexyl) imidazolium tetrafluoroborate	MIT
2-(2-(1,1-difluoro-2-hydroxy ethoxy)-1,1,2,2-tetrafluoroethoxy)-2,2 difluoroethylacrylate	FTGA
2,2'-azobis-(2,4-dimethylvaleronitrile)	ABVN
2,2-dimethoxy-2-phenylacetophenone	DMPA
2,2-dimethoxy-2-phenylacetophenone	DMPA
2,6-dimethylphenol	DMP
2-allyloxymethyl-2-ethyltrimethylene carbonate	AEC
2-Hydroxy-2-methylpropiophenone	HMPP
2-hydroxy-3-phenoxypropyl acrylate	HPA
2-methyl-acrylic acid-2-oxirane-ethyl ester	MAEOE
4-methyl benzophenone	MBP