

KEEPING UP WITH BATTERIES
















We have sifted through 1000s of articles on lithium-ion batteries for you! We have captured pretty much everything new and important that came out in *May 2018*. We have selected and categorized commercially-relevant articles, added some interesting news, and squeezed all this content into our comprehensive review.

Hope it makes your work easier and keeps you in touch with battery literature!

The Research Interfaces Team

ANODE



Designing high-capacity anode nanomaterials for Li-ion batteries 🔍	Wiley				
Development of Si-based thin film anodes for Li-ion batteries 🔍	Elsevier		Si		
Lithiation products of Si anode studied by SXES	ACS		Si		
Phase transition behavior at Si anode during cycling	RSC		Si		
In situ surface structure evolution of Si anodes by EC-AFM	Elsevier		Si		
Failure mechanism of SEI during lithiation of Si nanopillars	ACS		Si		
Simulation of lithiation process of core-shell vs film Si anodes	Springer		Si		
Microemulsion synthesis of micrometer-sized porous Si particles	Elsevier		Si		
Surface modification of Si particles via Prussian blue analogues	ACS		Si		
Mg-assisted catalytic growth of graphene cages on Si particles	Wiley		Si		
Silicene nanosheets prepared via liquid oxidation and exfoliation	Wiley		Si		
SiO _x encapsulated in graphene bubble film	Wiley		Si		
C/SiO ₂ /C and C/SiO ₂ anode material via template route	Elsevier		Si		
Dispersion-strengthened Si-SiOC-SiC-Li ₂ SiO ₃ composite anode	Elsevier		Si		
Binder-free Sn-Si heterostructure films via PE-CVD	RSC		Si		
Calendar-life vs cycle-life aging of cells with Si-G composite anodes	Elsevier		Si-G		★
Thick anode containing graphite/polymer mechanical buffer layer	Elsevier		Si-G		
Chemical evolution in Si-G anodes studied by vibrational spectroscopy	ACS		Si-G		
Porous a-Si film anode for all-solid-state battery	Nature	 	Si, SSB		
Understanding chemical processes during ageing of Li-ion batteries 🔍	RSC				 ★
Identification of Li plating using NFRA	Elsevier				
Thermal stability and evolution of graphite SEI	Elsevier		G		
Capacitive effects in NMC111/graphite cells	Elsevier		G		
I- and N-doped carbon microsphere anode material	ACS		C		
Dual-carbon battery with MCMB cathode and anode	Elsevier		C		
Chemo-mechanical expansion of Li electrode materials 🔍	RSC		SSB		 ★
Suppression of dendritic growth in Li-metal batteries 🔍	RSC		LiM		
Development of porous nanocarbon materials for Li-metal anodes 🔍	Springer		LiM		

Spatial distribution of Li in Li-metal anode by operando NDP	Nature		LiM	
Improving stability of Li-metal anode via nucleation barriers	Wiley		LiM	
Buildup of SEI on Li-metal anodes studied by reactive MD	ACS		LiM	
Spontaneous reduction of spray-coated GO layers on Li metal	Wiley		LiM	★
SEI formation on Li-metal anode in LiTFSI-VC electrolyte	ACS		LiM	
Li methyl carbonate as protective layer for Li-metal anode	ACS		LiM	
Composite protection layer for micro-patterned Li-metal anode	Elsevier		LiM	
Naphthalene-THF chemical polishing of Li-metal anode	Elsevier		LiM	
Sn-modified interface between Li anode and LLZNO electrolyte	RSC		LiM	
3D mixed electron-ion conductive framework for Li-metal anode	ACS		LiM	
Comparative LCA of batteries with Li-metal, Si, and graphite anodes	Springer		LiM, Si, G	

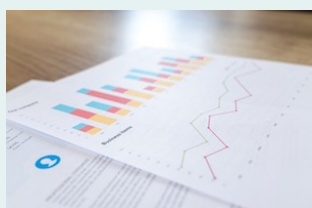
<p>LEGEND</p> <p> – link to the article or website</p> <p> – industry/government co-author</p> <p> – type of Li-ion battery</p> <p> – open access</p> <p> ★ – review article / highlight</p>	<p>TYPES OF LI-ION BATTERIES</p> <p>Si – silicon anode G – graphite anode</p> <p>SSB – solid-state Li-ion battery</p> <p>LiPo – lithium polymer battery</p> <p>TMO, M PO₄... – transition metal oxide, metal phosphate... anode chemistries</p> <p>LFP, NMC, NCA... – cathode chemistries</p>	<p>*Other abbreviations are chemistry or materials specific and commonly used throughout the field (such as chemical elements and formulas). If you are unclear, please click on the link and check.</p> <p>**Mistakes are unavoidable, so please forgive us if you find any.</p>
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Composites of complex Ti-based oxides as anode materials	Springer		TMO		
Template-free synthesis of TMO hollow spheres via Ostwald ripening	RSC		TMO		
Ti ₂ Nb _{2x} O _{4+5x} anode materials	RSC		TMO		
Anatase TiO ₂ /C-onion hybrid anode via sol-gel synthesis	RSC		TMO		
Na ⁺ -doped Li ₃ VO ₄ anode via sol-gel synthesis	Elsevier		TMO		
α-Fe ₂ O ₃ nanocone arrays by thermal oxidation/reduction	RSC		TMO		
C/Fe ₃ O ₄ sponge-like anode material	ACS		TMO		
Gelatin-assisted synthesis of hierarchical porous transition metal oxides	Elsevier		TMO		
All-spinel NiMn ₂ O ₄ -anode/LiNi _{0.5} Mn _{1.5} O ₄ -cathode cell	Wiley		TMO		
Ni _x Sn _y O _z composite anodes via galvanic replacement reaction	Elsevier				
Co-doped and C-coated SnO ₂ anode	Elsevier				
Disorder/order engineering concept for anode development	Elsevier				
Progress in Zn-based anodes for Li-ion batteries	RSC				
Layered Sn-sulfide and -selenide anode materials	RSC		S/Se		
P-based anode materials for Li-ion batteries	Elsevier				
AgP ₂ /C as anode material by ball milling	Elsevier				
Mesoporous MnP nanorods as anode material	ACS				

ELECTROLYTE

Designing electrolytes for HV Li-ion and solid-state batteries 	RSC		SSE		★
Development of solid electrolytes for Li-ion batteries	Elsevier		SSE		
Structure and interfaces in thiophosphate solid-state electrolytes	ACS		SSE		
Mitigating polarization at cathode/solid electrolyte interface	ACS		SSE, NMC		

Study of conductivity and dielectric properties of LLTO ceramics	Elsevier		SSE	
Li ⁺ conduction in oxide La–Li–Co–O band insulator	ACS		SSE	
Perovskite Li _{0.38} Sr _{0.44} Ta _{0.7} Hf _{0.3} O _{2.95} F _{0.05} electrolyte stable in moist air	Wiley		SSE, LFP	
Stability of Li-stuffed garnets against moisture, CO ₂ , and Li metal	Elsevier		SSE	
Impact of H ₂ O-induced degradation on Li ⁺ dynamics in LLZO	ACS		SSE	
Graphite interfacial modification for garnet-type solid-state battery	ACS		SSE, NMC	
Sn-modified interface between LLZNO electrolyte and Li metal	RSC		SSE, LFP	
LiBr additive in LLZO electrolyte using ball milling	Elsevier		SSE, LCO	
Cathode-garnet interface using mixed ionic-electronic conductor	Elsevier		SSE, TiS ₂	
3D mixed electron-ion conductive framework for Li-metal anode	ACS		SSE	
LiNi _{0.8} Co _{0.1} Mn _{0.1} O ₂ -Li ₆ PS ₅ Cl-binder slurry composite for SSB	Elsevier		SSE, NMC	
Failure mechanisms of solid-state batteries	Elsevier		SSE	
Hybrid electrolytes for Li-metal batteries	Elsevier		SSE	
Advancements in polymer-based composite electrolytes	Springer		SSE	
Pseudo solid-state electrolytes with biomimetic ionic channels	Wiley		SSE	
Vertically aligned ceramic-polymer interfaces for solid electrolytes	ACS		SSE	
Transition metal redox at PPC/LFP interface	RSC		LiPo, LFP	
Bipolar-stacked solid-state cell with integrated electrolyte and cathode	Elsevier		LiPo, LFP	
Rigid-flexible PAEK nonwovens polymer electrolyte	Elsevier		LiPo, LFP	
Understanding chemical processes during ageing of Li-ion batteries	RSC			
High throughput screening for wide temperature electrolyte	Elsevier		G/NMC	
Understanding long-chain Li alkyl carbonates as SEI components	ACS			
SEI formation on Li-metal anode in LiTFSI-VC electrolyte	ACS		LiM	
LiM-NMC622 cell using FEC and practical cathode loadings	ACS		LiM/NMC	
LiM-LiNiO ₂ cell using FEC and practical cathode loadings	ACS		LiM/LNO	
Effect of succinonitrile additive on cycling of cylindrical NMC532 cell	Elsevier		G/NMC	
DTYP multifunctional electrolyte additive for HV cells	RSC		LNMO	
CEP electrolyte additive for HV graphite/NMC622 cell	ACS		G/NMC	
LiDFP electrolyte additive for HV NMC111 pouch cell	ACS		G/NMC	
LiDFP electrolyte additive for HV NMC532 pouch cell	Elsevier		G/NMC	
LiDFBP additive for improved low-temperature electrode operation	Wiley		G/NMC	
LiBOB electrolyte additive for LiM/NMC metal battery	Wiley		LiM/NMC	
OMS electrolyte additive for graphite/NMC cell	Elsevier		G/NMC	
S-containing electrolyte additives for SEI formation in Li-ion cell	ACS			
Adiponitrile-based electrolyte for HV Li-ion batteries	Elsevier		G/NMC	
Hybrid electrolyte containing silane-Al ₂ O ₃ NPs for HV cells	Elsevier		LiM/LNMO	
EC-free electrolyte comprising sulfolane and LiFSI	Elsevier		G/LCO	
PMMA-IL-TFSI-based electrolyte for low-temperature performance	ACS		LiM/LTO	
Aqueous battery with water-in-salt electrolyte and NASICON electrodes	Elsevier			
Shear-thickening safety electrolyte based on SiO ₂ nanorods	ACS			
Fire-retardant high-concentration electrolyte with BTFE diluent	Elsevier		LiM/NMC	

 NEWS BOX


IEA: Global EV Outlook 2018 ([IEA](#))



Bloomberg New Energy Finance: Electric Vehicle Outlook 2018 ([Bloomberg](#))

Electric-car Batteries That Charge in Five Minutes Have Lured an Unlikely Investor: Big Oil ([Quartz](#))











"StoreDot says its flash batteries for mobile should be commercially available next year, according to the BP statement. It's unclear when the rapid-charging batteries for EVs will arrive."

Whatever Happened to That \$35,000 Tesla Model 3 You Still Can't Buy? ([The Guardian](#))

 SEPARATOR


Understanding performance benefits of multifunctional separators	ACS		G/LMO	★
Anti-piercing polymer/GO/polymer trilayer separator	Elsevier		LiM/LMO	
TiO ₂ -polymer coated separator to prevent dendrite growth	RSC		LiM/NMC	
Nonwoven PET/PP composite separator by electrospinning	MDPI		LiM/LFP	

 CATHODE

Micron-sized monocrystalline NMC111 cathode	RSC		NMC	
Capacitive effects in NMC111/graphite cells	Elsevier		NMC	
Urea-based hydrothermal synthesis of NMC532 cathode	Elsevier		NMC	
Ti ⁴⁺ and TiO ₂ surface modification of HV NMC622 cathode	ACS		NMC	
Organophosphate surface modification of NMC622 cathode	ACS		NMC	
NMC622-LiM cell using FEC and practical cathode loadings	ACS		NMC	
Effect of calcination temperature on LiNi _{0.76} Mn _{0.14} Co _{0.10} O ₂ cathode	Elsevier		NMC	
Microstructure evolution of concentration gradient Li[Ni _{0.75} Co _{0.10} Mn _{0.15}]O ₂	Wiley		NMC	
Ni-rich core-shell NMC811 via hydrothermal synthesis	ACS		NMC	
Conductive polymer encapsulation of Ni-rich cathodes	ACS		NMC	
Mitigating polarization at cathode/solid electrolyte interface	ACS		NMC, SSB	
NMC811-Li ₆ PS ₅ Cl-binder slurry composite for SSB	Elsevier		NMC, SSB	
C binder reduction in LiNi _{0.8} Co _{0.15} Al _{0.05} O ₂ cathode	Elsevier		NCA	
Stabilization of cathode materials by controlling vacant surface sites	Elsevier		LNMO	★
All-spinel NiMn ₂ O ₄ -anode/LiNi _{0.5} Mn _{1.5} O ₄ -cathode cell	Wiley		LNMO	
Effect of solution vs physically mixed precursors on cathode properties	Elsevier		LNMO	
LiNiO ₂ -LiM cell using FEC and practical cathode loadings	ACS		LNO	
Design and electrochemical behavior of Mn-rich cathodes	RSC		LMO	
Correlating V profile to molecular transformations in Li _x MnO ₂	ACS		LMO	
Cation and anion redox in Li-rich rock salt Li ₄ Mn ₂ O ₅ cathode	AAAS		LMO	

Design principles for disordered Li-excess rock salt cathodes	RSC			★
Origin of high capacity and poor stability of Li-rich layered oxides	ACS		LLO	★
Suppression of voltage decay in high-energy LLO cathode	Wiley		LLO	
Abundant nanoscale defects in LLO to improve voltage decay	Elsevier		LLO	
Phase separation of core-shell $x\text{Li}_2\text{MnO}_3 \cdot (1-x)\text{LiNiCoMnO}_2$ cathode	ACS		LLO	
$\text{Li}_{1.2}\text{Ni}_{0.2}\text{Mn}_{0.6}\text{O}_2$ cathode via calcination-free hydrothermal method	Elsevier		LLO	
Reversible anionic redox in tetrahedron Li_6CoO_4	RSC		LLO	
Template-free synthesis of TMO hollow spheres via Ostwald ripening	RSC		TMO	
Effect of nanostructuring on bond strength and disorder in V_2O_5 cathode	RSC		TMO	
H_2 plasma etching of $\alpha\text{-MoO}_{3-x}$ to improve capacity and stability	Elsevier		TMO	
Operando study of Li distribution in LFP using nuclear microanalysis	Elsevier		LFP	
Structural evidence for Mg-doped LiFePO_4 electrode polarisation	Elsevier		LFP	
Li sulfonate-grafted P(VDF-HFP) ionomer binder for LFP cathode	RSC		LFP	
Transition metal redox at PPC/ LiFePO_4 interface	RSC		LFP	
Effect of different C coating approaches on LiCoPO_4 performance	Elsevier		M PO_4	
F-doped and C-coated $\text{Li}_3\text{V}_2(\text{PO}_4)_3$ cathode	RSC		M PO_4	
LISICON structured $\text{Li}_3\text{V}_2(\text{PO}_4)_3$ cathode for low-temperature cell	RSC		M PO_4	
Defects, dopants and Li^+ mobility in $\text{Li}_9\text{V}_3(\text{P}_2\text{O}_7)_3(\text{PO}_4)_2$	Nature		M PO_4	
Crystal structure and EC properties of $\text{LiFePO}_4\text{F-LiVPO}_4\text{O}$ blends	Elsevier		M PO_4	
Optimizing morphology of $\text{LiMn}_{0.8}\text{Fe}_{0.2}\text{PO}_4$ mesocrystals for cathodes	ACS		M PO_4	
Early-stage sustainability evaluation of LiCoO_2 and LiMnPO_4 materials	Wiley		LCO, M PO_4	
$\text{LiMg}_{0.1}\text{Co}_{0.9}\text{BO}_3$ cathode via sol-gel synthesis	RSC		M BO_3	
Understanding chemical processes during ageing of Li-ion batteries 	RSC			★
Chemo-mechanical expansion of Li electrode materials	RSC		SSB	
Influence of inter-particle resistance on discharge profile of cathode	Elsevier			★
Cathode-garnet interface using mixed ionic-electronic conductor	Elsevier		SSB	
$\text{Li}_3\text{VP}_3\text{O}_9\text{N}$ as multi-electron redox cathode material	ACS			
Dual-carbon battery with MCMB cathode and anode	Elsevier			
Microencapsulating ATH, AlOOH, TPP flame retardants in cathode	Elsevier			



NEWS BOX

Storage Will Be Energy's Next Big Thing ([Bloomberg](#))

Just How Much Business Can Batteries Take from Gas Peakers? ([Greentech Media](#))

Sonnen Raises \$71M and Kicks Off a Strategic Partnership With Shell ([Greentech Media](#))















FABRICATION & CHARACTERIZATION



Advances in effective reduction of graphene oxide for energy storage 🔍	Wiley	🏛️	LiM	🔒	🔍
Electrostatic spray deposition for battery fabrication 🔍	Elsevier		SSB		🔍
Flame aerosol deposition of $\text{Li}_4\text{Ti}_5\text{O}_{12}$ layers on flexible substrates	Elsevier	🏛️	SSB		
Cold sintering process and its application in solid-state batteries 🔍	Elsevier		SSB		🔍
Nanoporous Cu current collector prepared by ultrasonic method	Elsevier				
Gelatin-assisted synthesis of hierarchical porous transition metal oxides	Elsevier		TMO		
Light-permeable and photoluminescent microbatteries for screens	RSC		micro		★
Semiconductor-based fabrication of 3D Li-ion microbatteries	Elsevier		micro	🔒	
Microbatteries batch fabricated by micro-fluidic MEMS packaging	Springer	🏛️	micro		
Development and application of AFM for Li-ion batteries 🔍	Wiley	🏛️		🔒	🔍
In situ surface evolution of Si anodes by EC-AFM	Elsevier	🏛️	Si		
Chemical evolution in Si-G anodes studied by FTIR and Raman	ACS	🏛️	Si-G		★
Ion chromatography to quantify transition metal dissolution in electrolyte	Springer	🏛️	TMO		
Origin of high capacity and poor stability of LLOs by in situ SXRD	ACS	🏛️ 🏛️	LLO		
Lithiation products of Si anode studied by SXES	ACS	🏛️	Si		
Characterization of battery materials using XPS	Elsevier	🏛️			
In situ investigation of dynamic processes in electrochemical materials	SPIE				
State of charge and defect diagnostics by in-situ MR imaging	Nature			🔒	★
Spatial distribution of Li in Li-metal anode by operando NDP	Nature		LiM	🔒	
Identification of Li plating using NFRA	Elsevier				
Capacitive effects in NMC111/graphite cells	Elsevier		NMC/G		
Operando study of Li distribution in LFP using nuclear microanalysis	Elsevier	🏛️	LFP		
Understanding chemical processes during ageing of Li-ion batteries 🔍	RSC	🏛️			🔍























MODELING & FUNDAMENTALS

Accelerating discovery of materials for clean energy using AI 🔍	Nature	🏛️ 🏛️			🔍 ★
Battery design and optimization using artificial neural networks	Elsevier				
Modeling and theoretical design of next-generation Li-metal batteries 🔍	Elsevier			🔒	🔍
Computational methods for crystal structure predictions 🔍	ACS				🔍 ★
Modelling 3D microbatteries with C-foam electrodes	Elsevier		micro		
Structure and mechanics of battery electrodes via DEM simulations	Elsevier				
Generation of virtual electrode microstructure using stochastic modeling	Elsevier	🏛️			
Multiscale model reduction for pore-scale simulation using GMsFEM	Elsevier				
Understanding chemical processes during ageing of Li-ion batteries 🔍	RSC	🏛️			🔍
Temperature path dependent voltage hysteresis in Li-ion cells	Elsevier				
Indentation analysis of pouch cell based on shape function theory	Wiley				
Dimensional analysis and modelling of energy density of Li-ion cell	Elsevier				
Buildup of SEI on Li-metal anodes studied by reactive MD	ACS		LiM		
Simulation of lithiation process of core-shell vs film Si anodes	Springer		Si		

Modeling failure mechanism of SEI during lithiation of Si nanopillars	ACS		Si		
Li ⁺ conduction in oxide La–Li–Co–O band insulator	ACS		SSE		
S-containing electrolyte additives for SEI formation in Li-ion cell	ACS				
Design principles for disordered Li-excess rock salt cathodes	RSC				
Cation and anion redox in Li-rich rock salt Li₄Mn₂O₅ cathode	AAAS		LMO		★
Correlating V profile to molecular transformations in Li _x MnO ₂	ACS		LMO		
Phase separation of core-shell xLi ₂ MnO ₃ ·(1-x)LiNiCoMnO ₂ cathode	ACS		LLO		
Reversible anionic redox in tetrahedron Li ₆ CoO ₄	RSC		LLO		
Effect of nanostructuring on bond strength and disorder in V ₂ O ₅ cathode	RSC		TMO		
Li ⁺ intercalation in lepidocrocite-type layered TiO ₂ structures	ACS		TMO		
Calculation of defects, dopants and Li ⁺ mobility in Li ₉ V ₃ (P ₂ O ₇) ₃ (PO ₄) ₂	Nature		M PO ₄		
Influence of inter-particle resistance on discharge profile of cathode	Elsevier	 			

OTHER BATTERY TECHNOLOGIES



Aqueous intercalation electrode materials for grid energy storage 🔍	Elsevier				
Mo and W disulfide-based nanocomposites for energy storage 🔍	Elsevier				
P-based anode materials for Li-/Na-ion batteries 🔍	Elsevier		Li-/Na-ion		
2D-material anodes for Na-ion batteries 🔍	Elsevier		Na-ion		
Role of geometric sites in 2D materials for energy storage 🔍	Elsevier				
Modeling and theoretical design of next-generation Li-metal batteries 🔍	Elsevier		LiM		
Critical parameters for practical viability of Li-S batteries 🔍	Wiley		Li-S		
Combining theory and experiment in Li-S batteries 🔍	Elsevier		Li-S		
Interface design and coating materials in Li-S batteries 🔍	Wiley		Li-S		
Polar materials for Li-S batteries 🔍	Wiley		Li-S		
Understanding and challenges in nonaqueous Li-O ₂ batteries 🔍	Wiley		Li-O ₂		
High-performance cathode materials for Li-O ₂ batteries 🔍	Wiley		Li-O ₂		
Interface engineering of C-based nanocomposites for energy storage 🔍	Wiley				
Transition metal oxalates as energy storage materials 🔍	Elsevier				
Li-ion supercapacitors: Fundamentals and energy applications 🔍	CRC		Li-ion C		book
Computational methods for crystal structure predictions 🔍	ACS				

NEWS BOX

JetSuite Strikes a Deal for Hybrid Electric Planes With Start-up Zunum Aero
[\(Los Angeles Times\)](#)

"It is the first substantial commercial order of an aircraft technology that could cut fuel costs and emissions, and make flights quieter."



China's Chilean Entry Raises Doubts About Lithium Price Outlook [\(Mining.com\)](#)