Curated Research Articles

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- **Beyond Imperfect Match: Silicon/Graphite Hybrid Anodes for High-Energy–Density Lithium-Ion Batteries** — score: 1.000 The article reviews the challenges and advancements in silicon/graphite hybrid anodes for lithium-ion batteries, focusing on mechanistic insights into their imperfect match, heterogeneous lithiation, and interfacial failure, to guide the design of more durable and high-energy-density batteries. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Ultrafast Charging Enabled by Soft Ion Channels on Layered Transition Oxide Cathodes in Aqueous Li-Ion Batteries** — score: 1.000 The study demonstrates that using dodecyl sulfate to create soft ion channels on LiCoO2 cathodes significantly enhances Li+ transport in aqueous Li-ion batteries, resulting in ultrafast charging capabilities and improved cycling stability. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Addressing Electro-Chemo-Mechanical Coupling Failure at the Sodium|Na3PS4 Interface towards Durable All-Solid-State Sodium Metal Batteries** — score: 1.000 This study utilizes operando synchrotron X-ray computed tomography to uncover failure mechanisms at the Na|Na3PS4 interface in all-solid-state sodium metal batteries, leading to the engineering of a protective Na3Sb-NaF layer that enhances battery durability and efficiency during cycling. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Temperature-Driven Solvation Sheath Reconfiguration Dictates Interphase Chemistry in Lithium-Ion Battery Electrolytes** — score: 1.000 The article investigates temperature-dependent solvation dynamics in lithium-ion battery electrolytes and their impact on electrode-electrolyte interphase chemistry, revealing that varying temperature conditions significantly influence interphase stability and performance, thus guiding electrolyte design for diverse thermal environments. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Tailoring Inner Helmholtz Layer via the Lewis Acid–Base Theory Endow an Elastic SEI for Dendrites-Free Lithium Metal Anode** — score: 1.000 The study presents a Lewis amphoteric V2CTx-Cu substrate that enhances the inner Helmholtz plane's interfacial electrolyte configuration, leading to an elastic LiF-dominated solid electrolyte interphase and dendrite-free lithium deposition in metal batteries, thereby optimizing performance through interfacial charge engineering. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Spatial-Confined and Bifunctional Nanoreactors Toward Dendrite-Free Anode and Shuttle-Suppressed Cathode in Zinc–Iodine Batteries** — score: 1.000 The study presents a 3D self-supporting hollow carbon nanofiber host embedded with CdO-CdS heterostructured nanoreactors, which enhances the performance of zinc-iodine batteries by preventing dendrite formation and inhibiting the polyiodide shuttle effect, achieving high capacity and exceptional cycling stability. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Manipulating Na/TM Ratio-Driven Structural Heterogeneity of O3-NaNi1/3Fe1/3Mn1/3O2 Cathode for High-Voltage Sodium-Ion Batteries** — score: 1.000 The study investigates how varying the Na:TM stoichiometry in O3-NaNi1/3Fe1/3Mn1/3O2 cathodes affects structural integrity and electrochemical performance, finding that a stoichiometric ratio of 1.00 minimizes microstrain and enhances capacity retention at high voltages, while excess sodium leads to instability and performance degradation. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **[ASAP] Operando Time-of-Flight Secondary Ion Mass Spectrometry Visualization of Reversible and Irreversible Reactions in Oxide-Based Solid-State Batteries** — score: 1.000 The article discusses the use of operando Time-of-Flight Secondary Ion Mass Spectrometry to visualize reversible and irreversible reactions occurring in oxide-based solid-state batteries. Journal: *ACS Energy Letters: Latest Articles (ACS Publications)*
- **[ASAP] Multimodal Analysis of Short- and Medium-Term Degradation in Multilayered All-Solid-State Batteries** — score: 1.000 The article discusses a multimodal analysis investigating

the short- and medium-term degradation of multilayered all-solid-state batteries. Journal: *ACS Applied Energy Materials: Latest Articles (ACS Publications)*

- **Localized Defective Zone Formation Driven by Selective Li+ Extraction Defines the High-Voltage Threshold of LiNi0.6Co0.2Mn0.2O2** — score: 1.000 The article discusses how localized defective zone formation, driven by selective lithium ion extraction, influences the high-voltage threshold in LiNi0.6Co0.2Mn0.2O2. Journal: *ScienceDirect Publication: Energy Storage Materials*
- **[ASAP] Correlating (Chemo-)Mechanical Coupling in TiS2 during Li+ Intercalation across Liquid and Solid Electrolytes Via Operando Analysis** — score: 1.000 The article investigates the (chemo-)mechanical coupling in TiS2 during Li+ intercalation across both liquid and solid electrolytes using operando analysis techniques. Journal: *ACS Energy Letters: Latest Articles (ACS Publications)*
- **Understanding the Cathode Electrochemistry of Humidified Solid-State Lithium-Oxygen Batteries** — score: 0.900 This study examines the electrochemistry of humidified solid-state lithium-oxygen batteries, revealing that repeated cycling leads to a shift in discharge products from lithium peroxide to lithium hydroxide, which degrades carbon cathodes and underscores the necessity for stable, carbon-free cathodes. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **An Electroanalytical Perspective on the Competitive Interplay between Zinc Deposition and Hydrogen Evolution in Aqueous Zinc Metal Batteries** — score: 0.900 The article discusses advancements in electroanalytical techniques to understand the competing processes of zinc deposition and hydrogen evolution in aqueous zinc metal batteries, emphasizing their implications for the design of more efficient anodes and battery performance. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Unlocking Kinetic Limitations in Hard-Carbon Anodes to Enable Practical Fast-Charging Sodium-Ion Batteries** — score: 0.800 The study investigates the rate-performance limitations of hard carbon anodes in sodium-ion batteries by engineering microstructural variations, leading to improved kinetic properties and paving the way for practical fast-charging applications. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **[ASAP] In Situ Electrochemical Cell Enabling Multimodal X-ray Analyses for Tracking Pt/C Degradation in PEMFC Cathodes under AST Conditions** — score: 0.800 The study presents an in situ electrochemical cell designed for multimodal X-ray analyses to monitor the degradation of Pt/C catalysts in PEMFC cathodes under accelerated stress testing conditions. Journal: *ACS Applied Energy Materials: Latest Articles (ACS Publications)*
- **Molecular Bottom-Up Design of Single-Site Copper-Palladium Catalysts for Selective Glycerol Electro-Oxidation** — score: 0.800 The article presents a bimetallic Cu-Pd single-site catalyst that enables selective electrooxidation of glycerol, achieving high efficiency and stability in producing valuable formate and C3 products while preventing catalyst poisoning. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Two roads to lithium nucleation** — score: 0.800 The article discusses a new physics-based framework that differentiates between substrate- and solid-electrolyte interphase-controlled nucleation pathways in lithium deposition, influencing battery stability and performance. Journal: *Nature Chemistry*
- **Atomic-Level Regulation of Gibbs Free Energy for Thermodynamically Suppressing Vanadium Dissolution in V6O13 Cathode Toward Stable Zinc Storage** — score: 0.800 This study presents a novel strategy of nitrogen refilling in oxygen vacancies of V6O13 cathodes to enhance structural stability and thermodynamically suppress vanadium dissolution, leading to improved capacity retention and cycling performance in zinc-ion batteries. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Molecular Engineering of Fluorinated Solvents Enables Practical Lithium Metal Batteries** — score: 0.800 The article discusses the engineering of fluorinated ethyl acetate derivatives to enhance

the stability and performance of lithium metal batteries, achieving high specific energy, low temperatures, and improved safety, which positions them as viable candidates for next-generation energy storage solutions. Journal: *Wiley: Advanced Energy Materials: Table of Contents*

- **Advancing Lithium-Mediated Nitrogen Reduction using Insights from Lithium-Ion Battery: Focusing on Uniform Li Plating** — score: 0.800 The article discusses advancements in lithium-mediated nitrogen reduction (Li-NRR) by leveraging insights from lithium metal batteries, focusing on uniform lithium plating to enhance Faradaic efficiency, energy efficiency, and stability for scalable ammonia production. It proposes hybrid strategies and research directions to overcome existing challenges in this field. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Mechanism for the Fluctuation in Coulombic Efficiency of Lithium Metal Anodes After Calendar Aging** — score: 0.800 The study investigates how calendar aging in lithium metal batteries affects Coulombic efficiency (CE) during rest and subsequent cycles, revealing that the interplay between solid electrolyte interphase evolution and dead lithium recovery influences CE fluctuations and emphasizes the reversible nature of rest-induced degradation. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Thermal Failure Mechanism of Sulfide-Based All-Solid-State Battery with Si-Based Anode** — score: 0.800 The article investigates the thermal failure mechanisms of sulfide-based all-solid-state batteries with silicon-based anodes, revealing that thermal instability initiates at the cathode and exacerbates at the anode, highlighting key products and reaction stages that lead to battery failure. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **[ASAP] Simply Fabricatable Reference Electrode for Studying Li Metal Interfaces Operando** — score: 0.800 The article discusses a novel, easily fabricated reference electrode designed for operando studies of lithium metal interfaces, enhancing the understanding of lithium-based energy storage systems. Journal: *ACS Energy Letters: Latest Articles (ACS Publications)*
- **Synergistic Rigidity–Flexibility Engineering of O3-Type Sodium Layered Oxide Cathodes Through Site-Specific High-Entropy Regulation** — score: 0.700 The article proposes a high-entropy engineering approach for O3-type sodium layered oxide cathodes, combining rigid Ca2+ in alkali-metal layers with flexible multi-cation configurations in transition-metal layers, enhancing structural stability and Na+ ion diffusion for improved battery performance. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Interface Stabilization via In Situ Lithiated Sn Interlayer in All-Solid-State Li-Metal Batteries: Toward Pellet-Type Cell to Pouch-Type Cell** — score: 0.700 The article presents a novel in situ lithiated tin interlayer that stabilizes the interface in pouch-type all-solid-state lithium metal batteries, enhancing performance and scalability while suppressing dendrite formation. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Ionic Liquids Electrolytes for High Performance Sodium Batteries—Chemistry, Composition, and Interfaces** — score: 0.700 This review highlights advancements in ionic liquid electrolytes for sodium batteries, focusing on the influence of ionic liquid chemistry and composition on anode performance and cycling stability, while emphasizing the need for further research into their interfacial interactions and design for enhanced sodium ion transport. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Electrochemical-mechanical regulation of lithium deposition morphology in lithium metal batteries** — score: 0.700 The article discusses the electrochemical and mechanical factors influencing the morphology of lithium deposition in lithium metal batteries, contributing to advancements in battery technology. Journal: *ScienceDirect Publication: Nano Energy*
- **Unravelling gas evolution mechanisms in battery electrode materials** — score: 0.600 The study identifies gas evolution mechanisms in LiFexMn1−xPO4 batteries, revealing that CO2 primarily comes from the cathode and H2 from anode reactions, with a carbon coating helping to enhance battery stability by reducing metal dissolution. Journal: *Nature Chemistry*

- **Accelerating the Discovery of High-Conductivity Glass Electrolytes via Machine Learning** — score: 0.600 This study introduces a machine learning interatomic potential that significantly enhances the prediction of sodium-ion conductivity in diverse glass electrolytes, revealing the critical influence of anion chemistry on ion mobility and providing a framework for designing high-performance solid electrolytes for batteries. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Single-Atomic Fe-S3-Mo Sites Triggered Fast Redox Conversion in Li-S Batteries** — score: 0.600 This study introduces a novel cathode for lithium-sulfur batteries, utilizing atomically dispersed iron single atoms on MoS2 nanosheets, which significantly enhances electrochemical performance by inducing interfacial charge redistribution and improving electrochemical kinetics. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Underlying Principles and Practical Design Strategies of Hydrogel Electrolytes for Long-Term Stable Zinc Batteries** — score: 0.600 This review examines the design principles of hydrogel electrolytes to enhance the long-term stability of aqueous zinc-ion batteries, highlighting advancements in polymer networks, water confinement, and ion transport optimization while discussing future potentials in energy storage and flexible electronics. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Ion-Pump-Regulated Highly Conductive Polymer Electrolyte to Enable the First All-Solid-State Rechargeable Fluoride-Ion Pouch Cells** — score: 0.600 The article presents the development of an innovative all-solid-state fluoride-ion pouch cell using a highly conductive polymer electrolyte enhanced by ion pump engineering, achieving a significant discharge capacity and improved ionic conductivity under moderate conditions. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Realizing Low-Pressure Operation of All-Solid-State Lithium–Sulfur Batteries Enabled by Carbon-Coated Current Collectors** — score: 0.600 This study shows that carbon-coated aluminum current collectors significantly enhance the performance and stability of all-solid-state lithium-sulfur batteries under low-pressure conditions, enabling improved cyclability and reduced interfacial resistance. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Multivariate Competitive Coordination Structure in Hydrated Eutectic Electrolytes for Ultra-Long Low-Temperature Aqueous Zinc-Ion Electrochemistry** — score: 0.600 The study presents a novel antifreezing hydrated eutectic electrolyte that enhances the performance of zinc-ion batteries at low temperatures by introducing dual-cations and organic additives, leading to stable zinc deposition and a long cycle life. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Observation of anomalous capacity hysteresis in commercial sodium ion batteries at low temperatures** — score: 0.600 The article investigates an unusual low-temperature behavior in sodium-ion batteries, revealing that their capacity hysteresis ratio can exceed one, indicating charging capacity surpasses discharging capacity. Journal: *RSC - EES Batteries latest articles*
- **A Review of Revealing the Impact of Transition Metals in Polyanionic Cathode Material Na4M3(PO4)2P2O7: Kinetic, Mechanisms and Optimization Strategies** — score: 0.500 This review analyzes the development of mixed polyanion cathode materials Na4M3(PO4)2P2O7 for sodium-ion batteries, detailing crystal structures, sodium ion migration mechanisms, optimization strategies—particularly for iron-based materials—and the importance of electrolyte advancement in enhancing the performance of cobalt and nickel-based materials. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Modulating interfacial shear of nanoconfined hydration layer via surface charging** — score: 0.500 The article discusses a method for controlling interfacial shear in nanoconfined hydration layers through the manipulation of surface charging, contributing to advancements in nanotechnology. Journal: *ScienceDirect Publication: Nano Energy*
- **Inhibiting Proton Corrosion and Hydrogen Evolution Reaction on the Surface of Zinc Anodes by Hierarchical Structure Hydrogel to Realize Long-Life Aqueous Zinc Metal**

Batteries — score: 0.500 The article presents a novel hierarchical structure hydrogel electrolyte that reduces zinc anode corrosion and hydrogen evolution while enhancing capacity in aqueous zinc metal batteries, leading to improved cycling stability and longevity. Journal: *Wiley: Advanced Energy Materials: Table of Contents*

- **Chloride-Enhanced High-Strength Polymer Electrolyte for Lithium-Metal Batteries** — score: 0.500 The study presents a polymer electrolyte enhanced by dual fillers, ZrCl4 and LiCl, which improves lithium-ion conductivity and stability, achieving 88.4% capacity retention over 1000 cycles in lithium-metal batteries, while maintaining excellent mechanical properties. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **[ASAP] Sodium-Ion Battery Cathode with Dominating Copper and Oxygen Redox Chemistry** — score: 0.500 The article discusses a sodium-ion battery cathode that leverages copper and oxygen redox chemistry to improve performance and efficiency. Journal: *ACS Energy Letters: Latest Articles (ACS Publications)*
- **Preconfiguring a High—Valent Ni State Decouples Lattice—Oxygen Activation From Dynamic Surface Reconstruction for Stable Water Oxidation at 2.0 A cm—2** — score: 0.400 The study presents a novel approach to enhance the stability and efficiency of NiFe (oxy)hydroxides for water oxidation by incorporating sulfur to decouple lattice-oxygen activation from surface reconstruction, achieving sustained industrial-level performance for over 4,000 hours in various alkaline environments. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Hydrogenation-Mediated Interfacial Chemistry toward SEI Engineering for Aqueous Zinc Metal Batteries** — score: 0.400 The article discusses a novel approach to engineering solid electrolyte interphases (SEI) through hydrogenation-mediated interfacial chemistry to enhance the performance of aqueous zinc metal batteries. Journal: *ScienceDirect Publication: Energy Storage Materials*
- **[ASAP] Single-Atom Catalysis with Anion-Enriched Environments for Enhanced Stability of Zn–I2 Batteries** — score: 0.400 The article discusses the use of single-atom catalysis in anion-enriched environments to improve the stability of Zn–I2 batteries. Journal: *ACS Energy Letters: Latest Articles (ACS Publications)*
- **[ASAP] Sn/Sb Doping Induced Local Structure Transformation to Enhance the Lattice Oxygen Redox Activity of P2-Type Sodium-Ion Cathode Materials** — score: 0.400 The article discusses how Sn/Sb doping in P2-type sodium-ion cathode materials leads to local structural transformations that enhance the redox activity of lattice oxygen, potentially improving battery performance. Journal: *ACS Applied Energy Materials: Latest Articles (ACS Publications)*
- **Ethylene carbonate-free electrolytes toward better lithium-ion batteries** — score: 0.400 The article discusses the benefits of developing lithium-ion batteries without ethylene carbonate, highlighting improvements in safety, voltage support, temperature resilience, and charging speed as significant advancements in energy storage technology. Journal: *Joule*
- **Synergistic Effect Between Carbon-Confined Bismuth Nanoparticles and K+-Ether Co-Intercalation Enables High-Rate Potassium Storage at -50 °C** — score: 0.400 The article explores how the combination of carbon-confined bismuth nanoparticles and K+-ether co-intercalation enhances potassium storage, achieving high rates even at -50 °C, addressing challenges related to K+ cation desolvation kinetics in potassium ion batteries. Journal: *RSC - EES Batteries latest articles*
- **[ASAP] d-Band Center Engineering of Ru-Based Oxygen Electrode Catalysts for Li–O2 Batteries** — score: 0.400 The article discusses the modification of d-band centers in Ru-based oxygen electrode catalysts to enhance their efficacy in lithium-oxygen (Li–O2) batteries. Journal: *ACS Applied Energy Materials: Latest Articles (ACS Publications)*
- **Recycling Spent Lithium-Ion Layered Cathodes: Toward Direct Single-Crystalline Regeneration Technology** — score: 0.400 The article reviews advancements in direct single-crystalline regeneration techniques for spent lithium-ion battery layered cathodes, discussing failure mechanisms,

performance variations, and future prospects to enhance sustainability in battery recycling. Journal: *Wiley: Advanced Energy Materials: Table of Contents*

- **Interfacial Engineering of NiCo Nanocones to Promote NiOOH Formation via Enhanced Dehydrogenation for Efficient Urea Electrooxidation** — score: 0.400 The article presents a NiCo bimetallic nanocone catalyst that enhances the formation of active NiOOH species and improves CO2 desorption for efficient urea electrooxidation, achieving remarkable performance and durability. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Multifunctional Electrolyte Additive toward Moisture-Tolerant, High Voltage (4.8 V) and Wide Temperature (−10 to 60 °C) Adaptable Lithium-Ion Battery** — score: 0.400 The article discusses the development of a multifunctional electrolyte additive, diethyl [4-(Trifluoromethyl) benzyl] phosphonate (DBP), which enhances the performance and stability of lithium-ion batteries under high voltage and extreme temperature conditions by improving the electrode/electrolyte interphase and accelerating lithium ion diffusion. Journal: *Wiley: Advanced Energy Materials: Table of Contents*