Curated Research Articles

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- **Decoding Short-Range Order in Amorphous Two-Dimensional Nanosheets for Efficient and Durable Ampere-Level Seawater Electrolysis: A Case Study of Amorphous Ni(OH)2** — score: 1.000 The study reveals the atomic-scale architecture of amorphous Ni(OH)2 nanosheets, identifying short-range order motifs that enhance their performance in seawater electrolysis, achieving efficient and durable hydrogen production. The incorporation of Pt single atoms further improves their catalytic activity and stability, transforming the understanding of amorphous materials in energy applications. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **In Situ Electrochemical Polymerization Enabling High-Performance Quasi-Solid-State Batteries** — score: 1.000 This article introduces a novel in situ electrochemical polymerization technique that utilizes high-voltage charging to achieve uniform polymerization for quasi-solid-state batteries, resulting in improved performance and safety. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Digital Twin of Solid Oxide Electrochemical Cells: From 3D Microstructure Reconstruction to Multiphysics Modeling** — score: 1.000 This review discusses the development of digital twin frameworks for solid oxide electrochemical cells, highlighting 3D microstructure reconstruction and multiphysics modeling to enhance design and performance optimization of SOC technologies. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Thermal Dynamics and Lithium Plating Detection in High-Power Li-Ion Batteries for eVTOL Applications** — score: 1.000 This study uses operando isothermal microcalorimetry to analyze thermal behavior and detect lithium plating in high-performance Li-ion batteries for eVTOL applications, emphasizing the importance of electrolyte engineering in enhancing safety and cycle life under extreme conditions. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Interplay Between the Dissolved Mn2+ and Solid Electrolyte Interphases of Graphite Anode** — score: 1.000 The study explores how dissolved Mn2+ interacts with the solid electrolyte interphase (SEI) on graphite anodes in lithium-ion batteries, revealing that Mn2+ promotes SEI growth by coordinating with solvents and generating gases that facilitate electrolyte infiltration. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Influence of Anode Reactivity and Chemical Crossover on the Formation of Cathode-Electrolyte Interphase in High-Nickel Layered Oxide Cathodes** — score: 1.000 The article investigates the impact of anode reactivity on the degradation of high-nickel layered oxide cathodes in lithium-ion batteries, revealing that unstable anodes lead to thicker cathode electrolyte interphases and increased polarization due to chemical crossover effects. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **In Situ Electrochemistry of Buried Interfaces in Metal Halide Perovskites: Probing Energy Bands, Halide Redox Activity, and Kinetics** — score: 1.000 The article discusses the use of electrochemical techniques to investigate and optimize the properties of buried interfaces in metal halide perovskites and related materials, enhancing our understanding of charge transport, energy alignment, and surface reactivity for improved optoelectronic device performance. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **A Quantitative Water-Speciation Identification Strategy Enables Efficient Four-Electron Conversion in Aqueous Zn-I2 Batteries** — score: 1.000 The article presents a quantitative water-speciation strategy to optimize the electrolyte environment in aqueous Zn-I2 batteries, enhancing ion transport and enabling efficient four-electron conversion, leading to improved battery capacity and durability. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Understanding Structural and Compositional Evolution during NMC Cathode Direct Recycling via Solid-State NMR** — score: 1.000 The article discusses how solid-state NMR spectroscopy is used to analyze structural and compositional changes in NMC cathodes during the direct

recycling of lithium-ion batteries, aiming to enhance recycling processes and achieve electrochemical performance on par with new materials. Journal: *Wiley: Advanced Energy Materials: Table of Contents*

- **Heterogeneity of the Dominant Causes of Performance Loss in End-of-Life Cathodes and Their Consequences for Direct Recycling** — score: 1.000 The article examines the degradation mechanisms affecting end-of-life Li-ion battery cathodes, particularly LiNixMnyCozO2 (NMC), highlighting that severe microstructural cracking is the primary cause of performance loss, which poses challenges for direct recycling methods. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **In Situ Diffraction and Ex Situ Transmission X-Ray Microscopy Studies of Solid-State Upcycling for NMC Cathodes** — score: 1.000 The study investigates the solid-state upcycling of recycled NMC622 cathodes to produce higher energy density NMC811 materials, utilizing in situ X-ray diffraction and transmission X-ray microscopy to analyze phase evolution and material distribution during the process. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Cathode Upcycling for Direct Recycling of Lithium-Ion Batteries Using a Precipitation Approach** — score: 1.000 Researchers have developed a cost-effective precipitation method to upcycle lithium-ion battery cathodes, converting low-nickel compositions to higher energy density forms while preserving particle structure, enhancing environmental sustainability in battery recycling. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Multiscale Design Strategies of Interface-Stabilized Solid Electrolytes and Dynamic Interphase Decoding from Atomic-to-Macroscopic Perspectives** — score: 1.000 The article reviews multiscale design strategies for interface-stabilized solid electrolytes in solid-state lithium metal batteries, examining their microstructure, ion transport, and interphase evolution to address interfacial challenges and enhance commercial viability. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **[ASAP] In situ X-ray Synchrotron Studies Reveal the Nucleation and Topotactic Transformation of Iron Sulfide Nanosheets** — score: 1.000 The study utilizes in situ X-ray synchrotron techniques to investigate the nucleation and topotactic transformation processes of iron sulfide nanosheets. Journal: *Journal of the American Chemical Society: Latest Articles (ACS Publications)*
- **Probing the proton exchange kinetics of BaZr0.1Ce0.7Y0.1Yb0.1O3− ceramic electrolyte by operando diffuse reflectance infrared Fourier transform spectroscopy** — score: 1.000 The article discusses the development of a custom operando setup for simultaneous infrared spectroscopy and electrochemical measurements to investigate the proton exchange kinetics in BaZr0.1Ce0.7Y0.1Yb0.1O3− ceramic electrolyte. Journal: *RSC - Energy Environ. Sci. latest articles*
- **Interfacial characterization in solid-state lithium metal batteries: advances in temporal, spatial, and energy resolution** — score: 1.000 The article discusses advancements in multidimensional characterization techniques that uncover hidden interfacial mechanisms in solid-state lithium metal batteries, enhancing understanding of their performance. Journal: *RSC - Energy Environ. Sci. latest articles*
- **Resting but not idle: unveiling the mechanistic origin of resting losses for zinc anodes** — score: 1.000 The article investigates the mechanisms behind capacity losses in zinc anodes, highlighting the significant impact of current collector materials through real-time electron transfer visualization and in situ operando ECMS techniques. Journal: *RSC - Energy Environ. Sci. latest articles*
- **Utilising acoustic techniques to improve understanding of the formation process in sodium-ion batteries** — score: 1.000 The article discusses the application of operando acoustic techniques for non-invasive monitoring of solid electrolyte interphase (SEI) formation and performance in sodium-ion batteries, enhancing the understanding of their formation processes. Journal: *RSC - EES Batteries latest articles*

- **Revisiting potassium intercalation in graphite: an operando characterisation and computational approach** — score: 1.000 The article explores the mechanisms of potassium intercalation in graphite using a multi-modal operando characterization approach to link electrochemical processes with structural changes, enhancing understanding of K-ion storage. Journal: *RSC - EES Batteries latest articles*
- **Visualizing diverse lithium growth and stripping behaviors in anode-free solid-state batteries with operando X-ray tomography** — score: 1.000 The article utilizes operando X-ray tomography to visualize and analyze the intricate growth and shedding behaviors of lithium metal electrodes in anode-free solid-state batteries. Journal: *RSC - EES Batteries latest articles*
- **Spatially-resolved degradation in high-voltage single-crystal cathodes and its mitigation via surface structural pillar and kinetic promoter** — score: 1.000 The article investigates the spatially-resolved degradation of high-voltage single-crystal cathodes and presents strategies for mitigation using surface structural pillars and kinetic promoters. Journal: *ScienceDirect Publication: Energy Storage Materials*
- **Understanding operando electronic resistance variation in Li-ion battery cathode materials using in-plane analysis** — score: 1.000 The article investigates the changes in electronic resistance of Li-ion battery cathode materials through in-plane analysis, aiming to enhance understanding of battery performance. Journal: *ScienceDirect Publication: Energy Storage Materials*
- **Towards Understanding Electrolyte-Dependant Dynamics and Kinetics of Lithium Deposition and Stripping by Operando Neutron Imaging** — score: 1.000 The article discusses research on lithium deposition and stripping dynamics in electrolytes using operando neutron imaging, aiming to enhance understanding of these processes for improved energy storage materials. Journal: *ScienceDirect Publication: Energy Storage Materials*
- **[ASAP] Fe-Doped MnO2 Catalysts for Li–O2 Batteries: Mechanistic Insights into Durability Enhancement via Operando XAFS** — score: 1.000 The article investigates the use of Fe-doped MnO2 catalysts in Li-O2 batteries, providing mechanistic insights into how these catalysts enhance durability through operando X-ray absorption fine structure (XAFS) analysis. Journal: *ACS Applied Energy Materials: Latest Articles (ACS Publications)*
- **[ASAP] Composite Internal Reflection Element Design for Advanced Electrochemical Attenuated Total Reflection Surface-Enhanced Infrared Absorption Spectroscopy Investigations** — score: 1.000 The article discusses the design of a composite internal reflection element for enhancing electrochemical attenuated total reflection surface-enhanced infrared absorption spectroscopy, aimed at improving investigations in this field. Journal: *ACS Applied Energy Materials: Latest Articles (ACS Publications)*
- **Electrolyte-Driven Suppression of Oxygen Dimerization and Oxygen Evolution in High-Voltage Li-Ion Batteries** — score: 0.900 The article presents an anthracene-functionalized gel polymer electrolyte that effectively suppresses oxygen dimerization and evolution in high-voltage lithium-ion batteries by stabilizing oxidized surface oxygen and scavenging singlet oxygen, leading to improved battery performance and longevity. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Tip Effect-Driven Charge Transport Enhancement in Silicon-Carbon Anodes for All-Solid-State Lithium-Ion Batteries** — score: 0.900 The article discusses the innovative use of the tip effect in a radial vertical graphene-encapsulated silicon anode to enhance charge transport and solid electrolyte interphase formation in all-solid-state lithium-ion batteries, resulting in improved performance and stability. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Solvation Chemistry-Driven Interfacial Engineering Enables Reversible Anionic Redox in Sodium-Layered Oxide Cathodes** — score: 0.900 The incorporation of PFPN additive into ester-based electrolytes enhances interfacial chemistry and enables highly reversible anionic redox reactions in sodium-layered oxide cathodes, significantly improving their cycling performance and energy density

for sodium-ion batteries. Journal: *Wiley: Advanced Energy Materials: Table of Contents*

- **Thick Electrode Design Enabled by a Carbon–Binder Domain–Resolved Dual-Pore Transmission Line Model for Lithium-Ion Batteries** — score: 0.900 The study presents a Dual-Pore Transmission Line Model (DTLM) to enhance ionic transport in thick lithium-ion battery electrodes by optimizing carbon black and binder ratios, resulting in improved rate capabilities through better electronic and ionic conduction. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Ultrahigh-Rate Lithium Storage in MoS2 Enabled by Isotropic Ion Transport and Fe-Atomic Site Conversion** — score: 0.900 The article presents a method to enhance lithium storage in MoS2 anodes through Fe doping, leading to isotropic ion transport and achieving ultrahigh charging rates of up to 50 A g−1 while maintaining significant capacity, which may benefit fast-charging lithium-ion batteries. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Local Electrochemical Co-Sintering Enables Stable High-Loading All-Solid-State Silicon Anodes in Li-Ion Batteries** — score: 0.900 The article presents a local electrochemical co-sintering (LECS) strategy that enhances the performance of high-loading silicon anodes in all-solid-state lithium-ion batteries by improving transport kinetics and reducing interfacial passivation through a novel silicon gradient architecture. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Challenges and Prospects of Alkali Metal Sulfide Cathodes Toward Advanced Solid-State Metal-Sulfur Batteries** — score: 0.900 This review discusses the mechanisms, challenges, and advancements of alkali metal sulfide cathodes in solid-state metal-sulfur batteries, emphasizing their potential for high stability and safety while outlining strategies for future research and development. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Lithiation-dependent solid electrolyte interphase nucleation pathways in Si/Li6PS5Cl interfaces uncovered by machine learning-accelerated simulations** — score: 0.900 The article explores lithiation-dependent nucleation pathways of solid electrolyte interphase at silicon and Li6PS5Cl interfaces using machine learning-accelerated simulations to enhance understanding of energy storage materials. Journal: *ScienceDirect Publication: Energy Storage Materials*
- **3D Tomography of Porous Battery Electrodes with In-situ Contrast Enhancement** — score: 0.900 The article discusses advancements in 3D tomography techniques for analyzing porous battery electrodes, focusing on in-situ contrast enhancement methods to improve imaging quality. Journal: *ScienceDirect Publication: Energy Storage Materials*
- **Molecularly Integrated Additive Engineering for Rapid Rejuvenation of Spent Electrolyte** — score: 0.800 The article introduces a molecularly integrated additive, TMSTz, that effectively addresses issues in spent electrolytes from lithium-ion batteries by neutralizing HF, reducing moisture, and preventing metal dissolution, enabling significant capacity retention and safety improvements for sustainable battery recycling. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Hierarchical Fluorinated Polymer Separator Design Mitigating Bilateral Ionic Crosstalk in Aqueous Batteries** — score: 0.800 The study presents a hierarchical fluorinated polymer separator that effectively regulates ion fluxes in aqueous zinc-ion batteries, mitigating bilateral ionic crosstalk and significantly enhancing the battery's cycle life and stability. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Tailored Ordering Enables High-Capacity Cathode Materials** — score: 0.800 The article discusses a new computational framework for designing high-capacity Li-ion battery cathodes by investigating the ordering stability of rocksalt-type LiMO2 materials, enabling the development of novel cobalt-free compositions with improved Li diffusion and phase stability. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Unveiling Entropy-Driven Performance Enhancement in Double Perovskite Oxygen Electrodes for Protonic Ceramic Electrochemical Cells** — score: 0.800 The study reveals that high-entropy double perovskite oxides significantly enhance the electrochemical performance of protonic

ceramic electrochemical cells, achieving high power and current densities, which could advance hydrogen production and sustainable energy solutions. Journal: *Wiley: Advanced Energy Materials: Table of Contents*

- **MXene-Scaffolded Planner Mesoporous Carbon with Homogeneous Electric Field Enabling Uniform and Robust SEI for Ultra-Stable Sodium Storage** — score: 0.800 The article presents a novel electrode architecture using MXene@mesoporous carbon nanosheets that regulates the electric field for sodium-ion batteries, resulting in a robust and uniform solid electrolyte interphase (SEI) and exceptional cycling stability, achieving 98.4% retention after 10,000 cycles. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Low-Reactivity Electrolytes Achieve Safe and Durable Energy-Dense NCM955|SiC Pouch Cells** — score: 0.800 The article presents a low-reactivity electrolyte (LRE) designed to enhance thermal stability and safety in energy-dense lithium-ion batteries, significantly improving performance and longevity while reducing combustion risks compared to conventional electrolytes. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Asymmetric-Orbital-Hybridization Induced Electron Redistribution Enabling Stable Sodium Layered Oxides** — score: 0.800 The article presents a strategy for enhancing the stability and capacity of sodium-layered oxide cathodes by utilizing electron redistribution through orbital hybridization, specifically with the compound NaNi0.5Mn0.35Ti0.15O2, which mitigates structural issues and improves redox processes. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **From HF Scavenging to Li-Ion Transport Enhancement: Multifunctional Separator Enabling Stable Li Metal Batteries in Carbonate-Based Electrolytes** — score: 0.800 The article introduces a multifunctional separator (APA-g-APT) designed to stabilize lithium metal batteries (LMBs) in carbonate-based electrolytes by scavenging HF byproducts and enhancing Li transport, resulting in improved cycling stability and safety. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Constructing LiMn6 Superlattice Covalent Framework to Enable Reversible Anionic Redox Toward Layer-Structured Oxide for Sodium Batteries** — score: 0.800 The article discusses the construction of a LiMn6 superlattice framework in manganese-based layered oxide cathodes to enhance anionic redox activity and structural stability in sodium batteries, resulting in high energy density and excellent cycling performance. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Insight Into All-Solid-State Lithium-Sulfur Batteries: Challenges and Interface Engineering at the Electrode-Sulfide Solid Electrolyte Interface** — score: 0.800 The article reviews recent advancements in all-solid-state lithium-sulfur batteries, highlighting persistent challenges such as low sulfur utilization and interface instability, while discussing strategies for interface engineering and sulfur cathode design to enhance battery performance and longevity. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Prolonging Storage Shelf-Life of Lithium Metal Batteries with Phase-Change Electrolyte** — score: 0.800 A novel temperature-responsive binary phase-change electrolyte (B-PCE) for lithium metal batteries significantly reduces self-discharge, achieving a projected shelf-life of 5.9 years and enhancing cycling performance, making it ideal for long-term energy storage applications. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Prediction of Structural Stability of Layered Oxide Cathode Materials: Combination of Machine Learning and Ab Initio Thermodynamics** — score: 0.800 This study developed a machine learning model combined with ab initio thermodynamics to predict the phase stability of layered oxide cathodes for Na-ion batteries, identifying key factors like transition metal ionic potential and sodium content that influence stability. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Reverse-Current Induced Cascade Degradation in Ni–Ru Electrodes: Tracing the Path**

from Noble Metal Loss to Substrate Corrosion — score: 0.800 The article examines the degradation process of Ni-Ru electrodes under reverse current in alkaline water electrolysis, revealing a pathway from Ru loss to Ni substrate corrosion, and suggests that reducing reverse current amplitude can significantly mitigate this degradation. Journal: *Wiley: Advanced Energy Materials: Table of Contents*

- **A Reductively Stable Electrolyte Realizes Deep Cycling Behavior in Anode-free Sodium Batteries** — score: 0.800 The article discusses a novel fluorine-free carborane electrolyte that enhances the cycling stability and coulombic efficiency of anode-free sodium batteries, enabling 1000 cycles with high capacity retention due to its robust solid-electrolyte interphase. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Synergistic Mo/V-Implanted 2D M3X2 MXene Nanoarchitectures for Enhanced Structural Stability and Ultrahigh Proton Storage Performance** — score: 0.800 The article presents a new medium-entropy TiVMoC2 MXene, achieved through Mo and V implantation into Ti3C2, which enhances structural stability and ultrahigh proton storage performance for energy storage applications, demonstrating exceptional capacitance and long-term durability. Journal: *Wiley: Advanced Energy Materials: Table of Contents*
- **Tuning Hard Carbon Pores at the Ångstrom Scale Facilitates Sodium-Ion Pre-Desolvation in High-Performance Sodium-Ion Batteries** — score: 0.800 The study presents an engineered hard carbon anode for sodium-ion batteries, featuring pore mouths under 3.5 Å to enhance Na pre-desolvation, resulting in improved initial Coulombic efficiency, capacity, and cycling stability compared to conventional materials. Journal: *Wiley: Advanced Energy Materials: Table of Contents*