ASX ANNOUNCEMENT
5 MARCH 2026

Critical Resources Limited

GAME-CHANGING DRY CATHODE TECHNOLOGY SUCCESSFULLY VALIDATED

Solvent-free cathode fabrication demonstrates controllable electrochemical performance and scalable manufacturing potential, advancing Critical Resources battery evaluation program.

- **Solid-state battery evaluation underway:** Critical Resources is undertaking the evaluation of advanced solid-state lithium-ion battery designs with leading US university laboratories, advancing toward prototype readiness while reducing technical risk and expanding future commercial optionality.

- **Laboratory-scale solvent-free cathode pathway validated**: Mechanically robust, electrochemically active Lithium Iron Phosphate (LFP) cathodes were fabricated using Dry Supersonic Deposition (DSD) **without solvents or polymer binders**, establishing a baseline for further solid-state battery development.

- **Manufacturing and strategic relevance:** Solvent-free DSD processing has the potential to support a scalable cathode and electrolyte manufacturing pathway, reducing process complexity.

- **Active material integrity preserved under deposition:** X-ray diffraction (XRD) confirms LFP retains its crystal structure across tested DSD conditions, addressing a key technical risk in solvent-free cathode manufacturing.

- **Strong binder-free bonding to aluminium current collectors**: Scanning Electron Microscopy (SEM) confirms dense, binder-free mechanical bonding between the cathode and aluminium current collector, supporting low resistance during charge–discharge cycling.

- **Electrochemical behaviour of cathode can be tuned for different applications**: Post-deposition heat treatment improves low-rate (energy-focused) performance, while as-deposited cathodes retain stronger high-rate (power-focused) tolerance, demonstrating controllable performance outcomes.

Critical Resources Limited (‘**Critical Resources’** or the ‘**Company**’, **ASX**:**CRR**) is pleased to announce a key technical milestone in its solid-state battery evaluation program, confirming that **Dry Supersonic Deposition (DSD)** can fabricate **mechanically robust and electrochemically active** lithium iron phosphate (**LFP**) cathodes **without the use of solvents or polymer binders**.

Importantly, these results validate solvent free cathode fabrication by DSD as a credible electrode manufacturing pathway, with the potential to lower energy intensity, simplify factory infrastructure, and improve environmental and safety outcomes — while enabling targeted trial of higher performance cathode and electrolyte materials to access alternative prototype development.

This laboratory-scale validation removes a central uncertainty in solvent-free, impact-based electrode manufacturing — whether high-velocity deposition can preserve active material integrity while delivering predictable electrochemical performance — and establishes a repeatable cathode manufacturing baseline for progression toward integrated solid-state cathode–electrolyte architectures.

Critical Resources holds an exclusive option over five granted U.S. patents and one pending application relating to solid-state lithium-ion battery technologies, supporting its strategy to evaluate safer, higher-performance and more sustainable energy storage solutions (refer ASX:CRR announcement 18 November 2025). All technical work is being undertaken within the CEPS research framework, ensuring strong IP protection for all new materials, processes and structures developed. In line with this strategy, two separate 12-month provisional U.S. patent applications have been filed covering both projects, reinforcing CRR's ability to secure early commercial and technological advantages.

The DSD project is being undertaken through a structured evaluation program at the South Dakota School of Mines & Technology (**SDM**), within the U.S. National Science Foundation-supported Centre for Solid-State Electric Power Storage (**CEPS**) framework (refer ASX:CRR announcement 2 February 2026).

DSD PROGRAM INITIAL RESULTS

Key Result	What Was Demonstrated	Why It Matters
Cathode integrity preserved	LFP cathode crystal structure remains intact after high-velocity dry deposition.	Addresses a primary technical risk and confirms the active material is compatible with solvent-free, impact-based manufacturing pathways.
Strong binder-free adhesion	Dense LFP layers mechanically bond directly to aluminium current collectors with no delamination observed.	Enables durable, electrically reliable electrodes manufactured without solvents or binders, supporting low interfacial resistance during repeated charge–discharge cycling.
Electro-performance confirmed	Heat treatment favours energy efficiency, while as-deposited cathodes retain higher rate capability.	Demonstrates that cathode properties can be tuned to suit different battery applications, from energy-focused to higher-power use cases.

DRY SUPERSONIC DEPOSITION (DSD) – WHY DOES IT MATTER

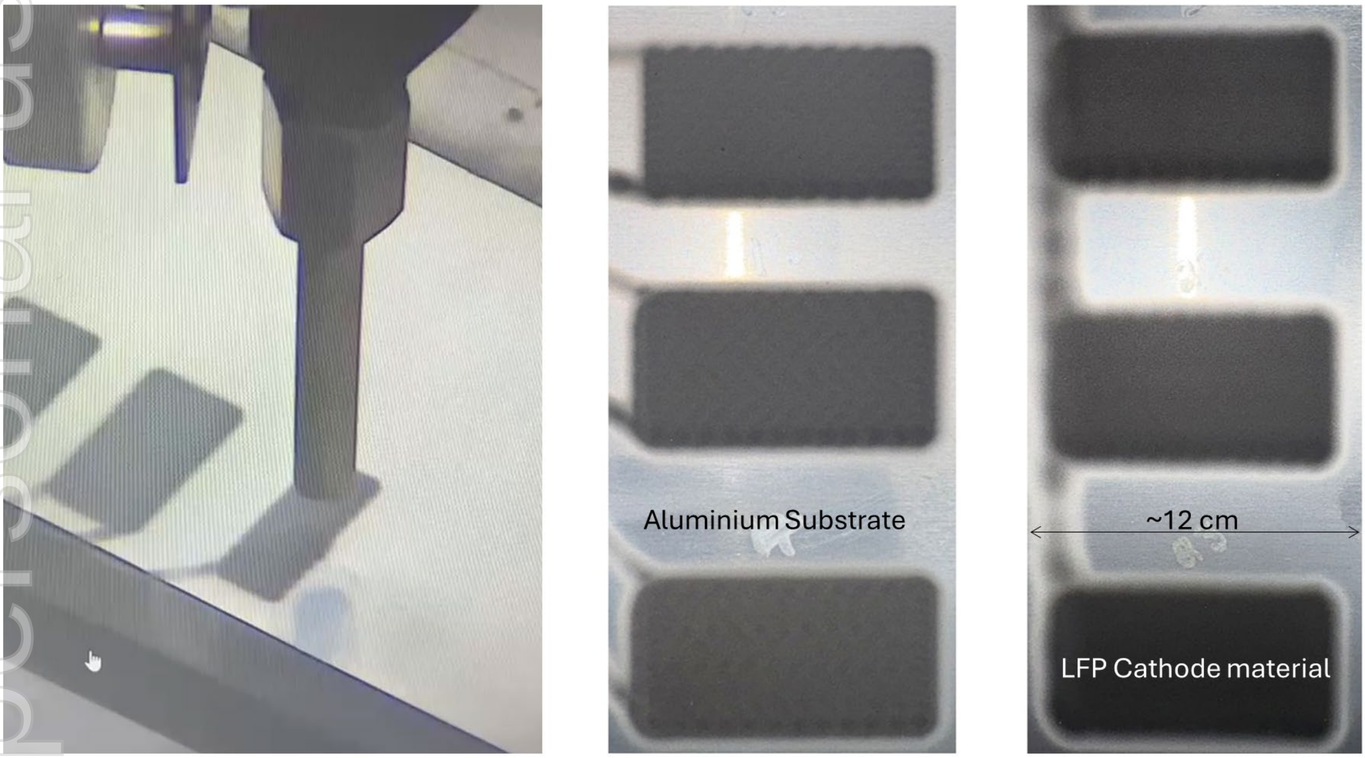
DSD is a solvent-free electrode manufacturing technique that forms lithium-ion battery cathode layers without solvents, or polymer binders. Instead, dry powder particles are accelerated to supersonic velocity in an inert gas stream and mechanically consolidated directly onto a conductive substrate, eliminating conventional drying and solvent-handling steps.

CRR is evaluating DSD because electrode drying and solvent recovery represent a material contributor to manufacturing energy use, capital intensity, and process complexity in conventional slurry-casting production. A solvent-free pathway has the potential to simplify manufacturing flows and improve safety outcomes, particularly for infrastructure-scale stationary storage.

Critical Resources Managing Director Tim Wither commented: 'These results mark an important milestone in our solid-state battery evaluation program. We have demonstrated that dry supersonic deposition can produce functional, solvent-free cathodes without damaging the active material, while delivering predictable and tunable electrochemical performance.

'This work materially de-risks a potential cathode manufacturing pathway that is simpler, safer and more energy-efficient than conventional processes. While testing remains at laboratory scale, it establishes a clear and repeatable baseline from which we can progress toward solid-state electrolyte integration and early prototype development.

'Importantly, we are advancing this strategy in a disciplined, milestone-based and capital-light manner, focused on technologies that are relevant to real-world, infrastructure-scale energy storage applications and that expand our future partnership and commercial options aligned with our broader critical minerals portfolio.'



Demonstration of cathode material being deposited onto aluminium substrate.

Trials with different application parameters/

Figure 1 *– Dry-Supersonic-Deposition (DSD) of Lithium-Iron-Phosphate (LFP) cathode material onto aluminium foil substrate.*

CATHODE MANUFACTURING CONTEXT AND RATIONALE

In a lithium-ion battery, the cathode is the primary structure responsible for lithium storage and release during charge and discharge. Its internal architecture directly influences energy utilisation, power capability, internal resistance and long-term durability. As a result, **the method used to manufacture the cathode has a material impact on battery performance, safety and reliability**.

Conventional lithium iron phosphate (LFP) cathodes are typically produced using slurry-casting processes, in which active material is mixed with liquid solvents and polymer binders, coated onto aluminium foil, and dried in large industrial ovens. This conventional cathode approach requires solvent handling systems, binder chemistries, drying infrastructure, and associated ventilation and recovery equipment. Beyond high energy and capital intensity, slurry-based processing can introduce **structural variability within the cathode layer**, including binder-rich regions and interfacial inconsistencies that may adversely affect ion transport, electrical continuity and mechanical stability.

Dry Supersonic Deposition (DSD) takes a fundamentally different approach to cathode fabrication. Dry LFP powder is accelerated in a supersonic inert gas stream and deposited directly onto an aluminium current collector at high kinetic energy. Upon impact, particles undergo plastic deformation and mechanically bond to the substrate and to each other, forming a **dense, binder-free cathode layer without the use of solvents or polymer binders**. Because consolidation is driven by kinetic energy rather than solvent evaporation, **cathode density, interfacial bonding and microstructure can be deliberately influenced through controlled deposition parameters**.

A mechanically consolidated, binder-free cathode architecture may also offer advantages as battery systems evolve toward solid-state configurations, where interface quality, layer density and mechanical integrity become increasingly important to performance and durability.

CATHODE VALIDATION

Dry Supersonic Deposition (DSD) testing evaluated whether commercial lithium iron phosphate (LFP) cathode material could withstand high-velocity, solvent-free deposition while remaining **structurally intact and mechanically bonded** to aluminium current collectors. This is a critical requirement for any cathode manufacturing process, as excessive kinetic energy can damage the active material or compromise adhesion at the cathode–current collector interface.

X-ray diffraction (XRD) analysis confirmed that the LFP crystal structure was retained under all tested deposition conditions, with **no evidence of phase decomposition or chemical degradation**. This demonstrates that the LFP active material survives supersonic impact consolidation without structural damage that would otherwise impair electrochemical performance. Variations in deposition energy were reflected in changes to diffraction peak sharpness, indicating that **crystallinity and microstructure can be influenced through controlled processing parameters**.

Scanning electron microscopy (SEM) analysis (**Figure 2**) showed that deposited cathode layers formed **dense, mechanically anchored coatings** on aluminium substrates. The cathode–current collector interface exhibited strong mechanical interlocking, with **no large interfacial voids or delamination features observed**. While surface morphology was heterogeneous, the coatings remained continuous, confirming effective particle consolidation and adhesion — a key determinant of electrical conductivity and long-term mechanical durability.

Key outcomes from this validation phase include:

- Confirmation that LFP active material remains chemically and structurally stable under high-velocity deposition (XRD).
- Demonstration of strong, binder-free mechanical bonding between the cathode layer and aluminium current collector (SEM; **Figure 2**).
- Definition of a stable DSD operating envelope suitable for further optimisation and refinement.

Collectively, these results address two critical technical risks associated with solvent-free cathode manufacturing: **preservation of active material integrity under impact-based processing**, and **formation of a**

robust, mechanically interlocked cathode–collector interface capable of supporting reliable electrochemical operation.

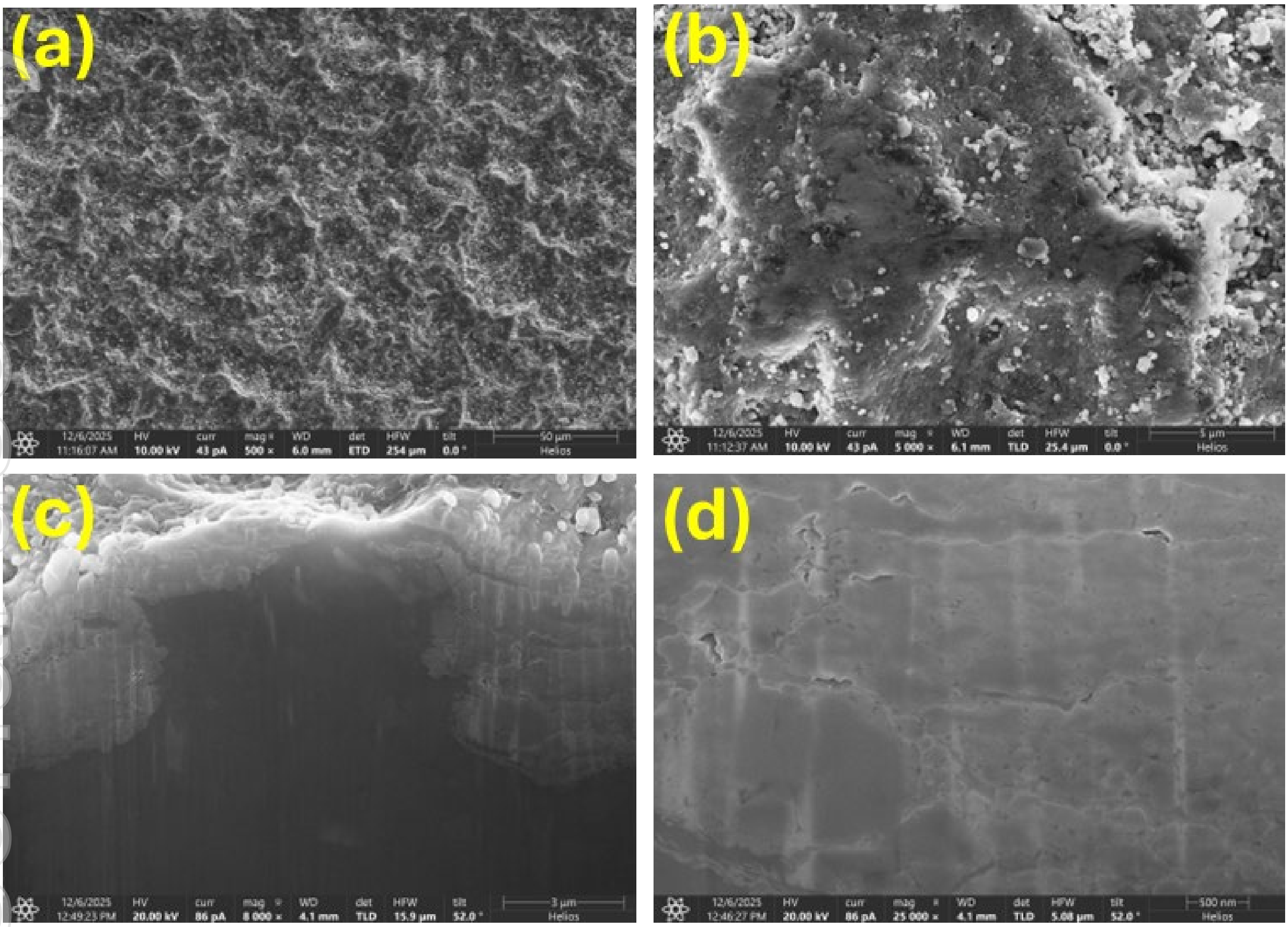


Figure 2 - SEM micrographs of DSD-fabricated LFP cathode on aluminium current collector. Surface views (**images a & b**) show a continuous heterogeneous surface with plastically deformed and partially intact particles. Cross-sections (**images c & d**) show a thin, dense deposited layer with strong mechanical interlocking into the aluminium substrate, with no large interfacial voids or evidence of delamination observed.

ELECTROCHEMICAL PERFORMANCE

The dry-deposited cathode material was electrochemically evaluated in standard coin-cell (CR2035) configurations using a conventional liquid electrolyte to establish a baseline performance prior to integration into solid-state battery architectures.

Electrochemical testing of DSD-fabricated LFP electrodes demonstrates that **cathode microstructure has a direct and measurable influence on battery performance**. In lithium-ion batteries, the internal atomic arrangement of the cathode material—including crystallinity, particle contact, porosity and interfacial bonding—governs the transport of lithium ions and electrons through the electrode. Variations in cathode atomic structure therefore influence internal resistance, reaction kinetics and capacity utilisation.

To isolate the impact of atomic structure, two cathode conditions were evaluated:

- **As-deposited:** LFP cathodes tested immediately after dry supersonic deposition.

- **Annealed:** LFP cathodes subjected to a controlled, low-temperature post-deposition heat treatment to partially restore crystalline order.

Annealing reduces impact-induced structural disorder within the LFP particles and improves crystallinity. This structural refinement alters the electrochemical response, influencing polarisation, redox definition and rate capability.

Comparison of the as-deposited and annealed cathodes reveals a **clear and controllable performance trade-off**. Annealed cathodes exhibit lower polarisation and a more classical LFP electrochemical response, supporting improved capacity utilisation under slower cycling conditions. In contrast, as-deposited cathodes retain a more disordered microstructure that limits low-rate efficiency but provides **comparatively stronger tolerance at higher charge and discharge rates (C-rate)**. C-rate defines how fast a battery is charged or discharged relative to its capacity, where 1C equals a one-hour charge or discharge.

In practical terms: *annealing acts as a tuning step that trades some fast-charge tolerance in exchange for greater energy efficiency during normal operation. This means cathode performance can be deliberately optimised toward the intended end-use — whether that is steady-state stationary storage or higher-power duty cycles.*

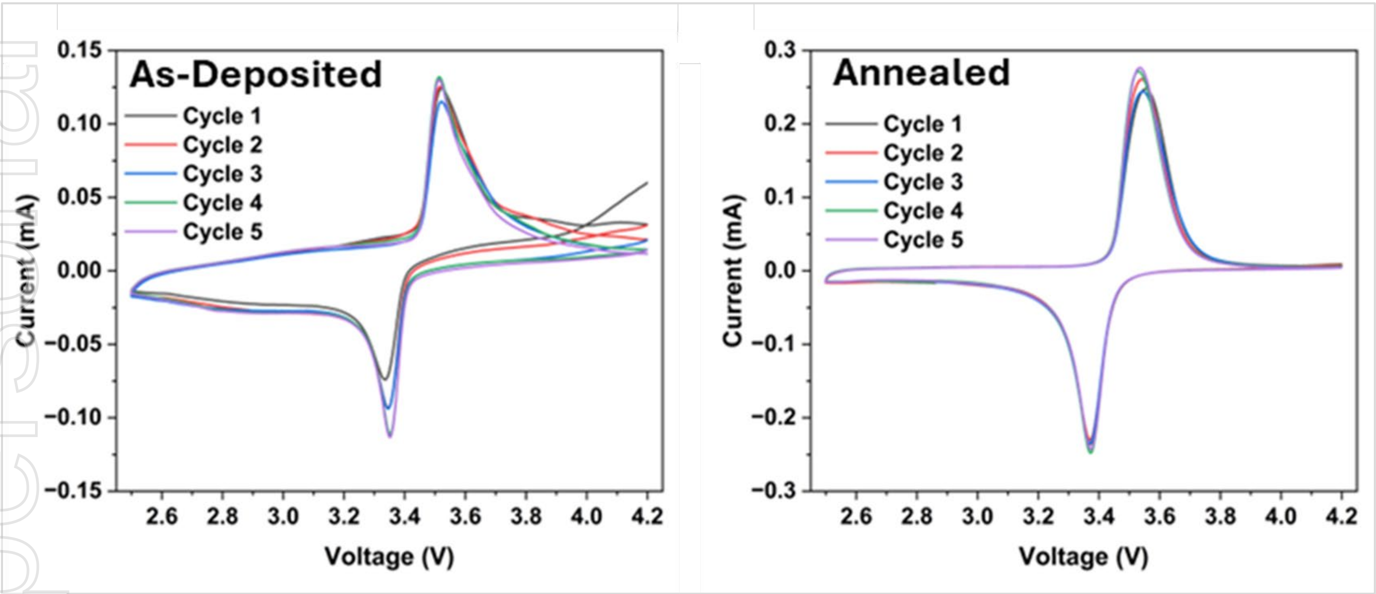


Figure 3 - Cyclic voltammetry of DSD-fabricated LFP electrodes. (**a**) As-deposited cathode (no heat treatment) shows broader redox features and higher polarization, while (**b**) annealed cathode exhibit sharper, more stable peaks and near double peak current (mA) indicating partial restoration of LFP crystalline structure.

Low-rate performance (0.1–0.2C)

Low-rate testing corresponds to slower charge and discharge conditions, where lithium ions have sufficient time to fully insert into and extract from the cathode lattice. Under these near-equilibrium conditions, **structural order within the cathode becomes the dominant performance factor**.

Annealed electrodes delivered higher discharge capacity at low rates (**Figure 4a**). This improvement is attributed to partial restoration of the crystalline LFP structure during post-deposition heat treatment. Improved crystallinity provides more defined lithium diffusion pathways and more uniform phase transitions during cycling, reducing internal resistance and improving utilisation of the active material. As a result, a greater proportion of the theoretical capacity is accessed during slow cycling.

High-rate performance (≥1C)

At higher C-rates, charge and discharge occur more rapidly and performance becomes dominated by kinetic limitations rather than equilibrium thermodynamics.

Under these conditions, the as-deposited electrodes showed comparatively stronger capacity retention (**Figure 4c**). Deposition-induced structural disorder creates a broader distribution of lithium diffusion pathways and local transport environments. While this reduces structural perfection and low-rate efficiency, it enables shorter diffusion distances and more distributed reaction pathways during rapid cycling, supporting improved tolerance to higher current densities.

Overall interpretation of Electrochemical Performance and Development Significance

Together, these results demonstrate that **deposition energy and post-deposition annealing can be used to deliberately tune cathode behaviour**, allowing optimisation toward either:

- **Maximum energy utilisation** under steady-state, low-rate operating conditions (e.g. stationary energy storage), or
- **Enhanced power delivery and kinetic tolerance** under higher-rate load profiles.

From a development perspective, the ability to engineer cathode performance through controlled processing parameters is a critical step in establishing dry supersonic deposition as a **viable and scalable cathode manufacturing pathway**.

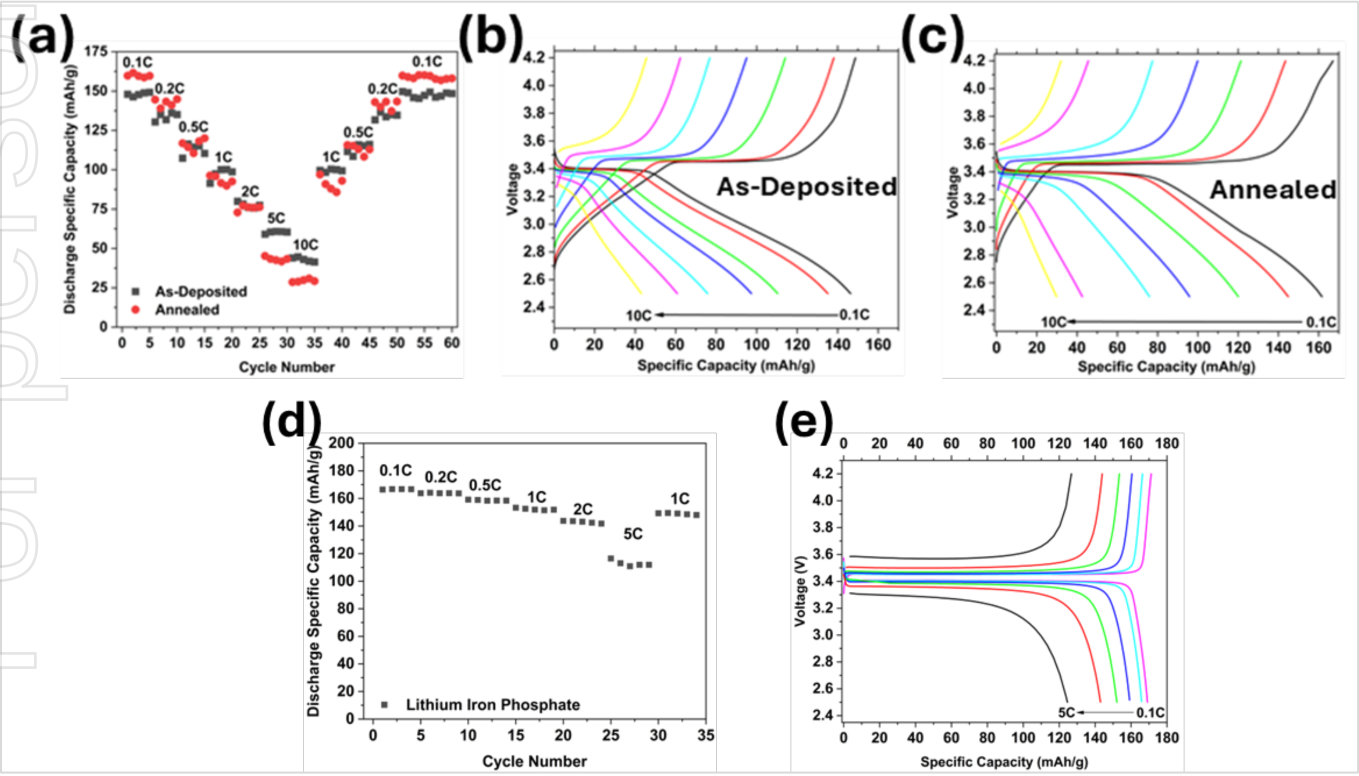


Figure 4 - Electrochemical comparison of as-deposited and annealed LFP cathodes (**a**) Rate-performance plot (0.1C to 10C sequence and return to low rate). (**b**) Representative galvanostatic charge/discharge curves of the as-deposited electrode, showing suppressed/tilted plateau behaviour consistent with deposition-induced disorder. (**c**) Curves for the annealed electrode, showing partial restoration of the LFP plateau and incomplete recrystallization under the applied annealing condition. (**d**) Discharge specific capacity of slurry coated LFP cathodes and (e) curves for slurry coated LFP as comparison.

STRATEGIC RELEVANCE TO CRR AND INFRASTRUCTURE-SCALE ENERGY STORAGE

Global demand for stationary battery storage is increasing, driven by grid-connected electrification and data centre growth. These applications place strong emphasis on safety, reliability, predictable performance, and scalable manufacturing.

Solvent-free cathode processing is strategically relevant because conventional slurry-based cathode manufacturing relies on solvent handling, drying infrastructure and recovery systems that materially contribute to factory complexity, energy use and permitting considerations. By demonstrating functional solvent-free cathodes with preserved active material integrity, strong bonding, and tuneable electrochemical behaviour, CRR is de-risking a potential manufacturing pathway that may support future licensing, partnerships or downstream collaboration — while maintaining a disciplined, capital-light evaluation approach.

NEXT STEPS

Following successful laboratory-scale validation of solvent-free LFP cathode fabrication using Dry Supersonic Deposition (DSD), the next phase of work will focus on **refinement, integration and application-relevant optimisation** within CRR's structured solid-state battery evaluation program. Key next steps include:

- **Refine DSD process parameters -** Further optimisation of deposition parameters to improve coating uniformity, reproducibility and robustness, and to define a stable operating window suitable for ongoing evaluation and potential scale-up.

- **Expanded electrochemical data -** Broader electrochemical testing across defined C-rate ranges and extended cycling to strengthen the performance dataset and support independent technical assessment of DSD-fabricated cathodes under application-relevant conditions.

- **Optimise cathode for target applications -** Use controlled deposition energy and post-deposition treatments to deliberately tune cathode performance toward either energy-focused, steady-state operation (e.g. stationary energy storage) or higher-power duty cycles, aligned with intended end-use profiles.

- **Evaluate high-performance cathode materials** - Extend DSD trials to other commercially relevant cathode chemistries to assess deposition behaviour, microstructural response and electrochemical performance informing broader applicability of the DSD manufacturing pathway.

- **Advance DSD project to solid-state electrolyte integration -** Progress from standalone cathode validation to composite and bilayer cathode–electrolyte structures, including sequential deposition of cathode and solid-state electrolyte layers to evaluate interfacial bonding, transport behaviour and mechanical integrity.

These activities represent **defined technical gates** within CRR's broader solid-state battery evaluation strategy and are intended to systematically de-risk solvent-free manufacturing pathways while maintaining a **disciplined, capital-light and option-based approach**. Outcomes from this phase will inform subsequent decisions regarding prototype development, partnerships, licensing opportunities and downstream collaboration.

This announcement has been approved for release by the Board of Directors of Critical Resources.

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E: info@criticalresources.com.au
P: +61 (8) 9465 1024

ABOUT CRITICAL RESOURCES LIMITED

Critical Resources Limited (ASX:CRR) is an Australian mining and technology company focused on the discovery and development of critical metals and next-generation battery technologies essential to a sustainable future. The Company holds a diversified portfolio including the Mavis Lake Lithium Project in Ontario, Canada, the Halls Peak Base Metals Project in New South Wales, and a growing gold portfolio in New Zealand.

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