FULL FORMAT DSD POUCH CELL SUSTAINS MORE THAN A MONTH OF CONTINUOUS CYCLING

Laboratory-scale, full-format pouch cell – the solvent-free DSD LFP/LLZO cathode/electrolyte matrix successfully completes retention testing – approximately 780 hours of continuous cycling.

- **Extended retention testing complete: over 780 hours** of continuous electrochemical testing of a single hand-assembled laboratory pouch cell at a 0.2C charge–discharge duty cycle – a five-hour charge and a five-hour discharge. 0.2C is an industry-standard rate for retention testing.

- **Cathode chemistry active throughout:** The cell delivered an initial specific capacity of approximately 145 mAh g^{-1} at 0.2C and retained approximately 75% after 65 cycles. The characteristic LFP voltage plateau at 3.4–3.5 V was present in every one of the 65 cycles, and coulombic efficiency remained near 100% for the majority of the test, consistent with the cathode chemistry remaining electrochemically active throughout.

- **Consistent with published performance:** Initial capacity is consistent with the peer-reviewed coin-cell result for pure DSD-deposited LFP cathodes (refer ASX:CRR announcement 2 July 2026), allowing for the differences in test rate and composition.

- **Material durability in a full-format laboratory pouch cell:** The results indicate that full-format cycle life is a cell-engineering matter rather than a material limitation, and this defines where the optimisation effort now focuses.

- **Early steps in scale-up:** These results are the program's first steps on that path – a working full-format cell from a single first-generation build, a month of sustained cycling, and a clean engineering baseline for the optimisation phase, which will be supported by the Digital Twin modelling at CSIRO's Lab22 (refer ASX:CRR announcement 27 August 2026).

- **Early-stage, liquid-electrolyte baseline:** The cell uses a conventional liquid reference electrolyte, chosen to isolate the DSD cathode matrix against a known baseline. Proprietary ASE solid-state electrolyte has not yet been integrated. This is laboratory-scale work, not commercial manufacturing.

Critical Resources Limited ('**Critical Resources**' or the '**Company**', **ASX**:**CRR**) is pleased to report the results of extended capacity retention testing of a single full-format pouch cell built with the LFP/LLZO cathode matrix produced using Dry Supersonic Deposition (DSD) and a liquid reference electrolyte – a configuration chosen to isolate the performance of the DSD-built cathode against a known baseline – completing the electrochemical testing of this first-generation full-format pouch cell.

The results show that the solvent-free, binder-free LFP/LLZO cathode matrix – deposited in a single dry step (refer ASX:CRR 16 June 2026) – sustains more than a month of continuous charge–discharge cycling in a full-

format cell, with results consistent with the cathode's electrochemistry remaining active throughout and indicating that the observed capacity fade is associated with the unoptimised cell build and reference components rather than the deposited material.

The evaluation program is being conducted at the South Dakota School of Mines & Technology (SDM) within the Centre for Solid-State Electric Power Storage (CEPS), supported by the US National Science Foundation (NSF). The program is led at SDM by Dr Alevtina Smirnova, Director of CEPS and Technical Advisor to Critical Resources, whose research developed the solid-state battery IP over which the Company holds its exclusive option (refer ASX:CRR announcements 17 February 2026 and 18 November 2025).

WHAT WAS TESTED

The test pouch cell comprises the ~15 µm DSD-deposited LFP/LLZO cathode matrix – lithium iron phosphate (LFP) cathode material, lithium lanthanum zirconium oxide (LLZO) reference electrolyte and a carbon-nanotube (CNT) conductive network – paired with a standard liquid reference electrolyte ($LiPF_6$ in organic carbonates, EC/DMC) and a lithium-metal anode, following conditioning (formation) at 0.05C. The liquid reference electrolyte and lithium-metal anode are known, well-characterised components: with everything else in the cell standard, the test isolates the variable that matters – the DSD-built cathode matrix. The cell is one of the further pouch cells committed to extended retention testing in the Company's 16 July 2026 announcement, built on the same platform as the cell that delivered the rate-capability results reported there. The cathode has an active-material mass loading of 3–5 mg cm^{-2}, and all testing was conducted at room temperature.

Figure 1 – The full-format DSD pouch cells under electrochemical testing

Where the rate-capability test asked how much of the cathode's capacity is accessible at increasing power demand, retention testing asks the complementary question: how much of that capacity the cell keeps under sustained, repeated cycling. The cell was cycled at 0.2C – a five-hour charge and a five-hour discharge – with a one-hour rest following each charge and each discharge step. Each full cycle therefore takes approximately 12 hours, and the 65-cycle program represents approximately 780 hours – more than one month – of continuous electrochemical testing. The 0.2C rate was selected deliberately: it is the industry-standard rate for retention testing, slow enough that measured fade reflects genuine cell ageing rather than rate limitation, and it approximates the daily charge–discharge duty cycle of the stationary storage, data-centre and defence infrastructure applications the Company is targeting.

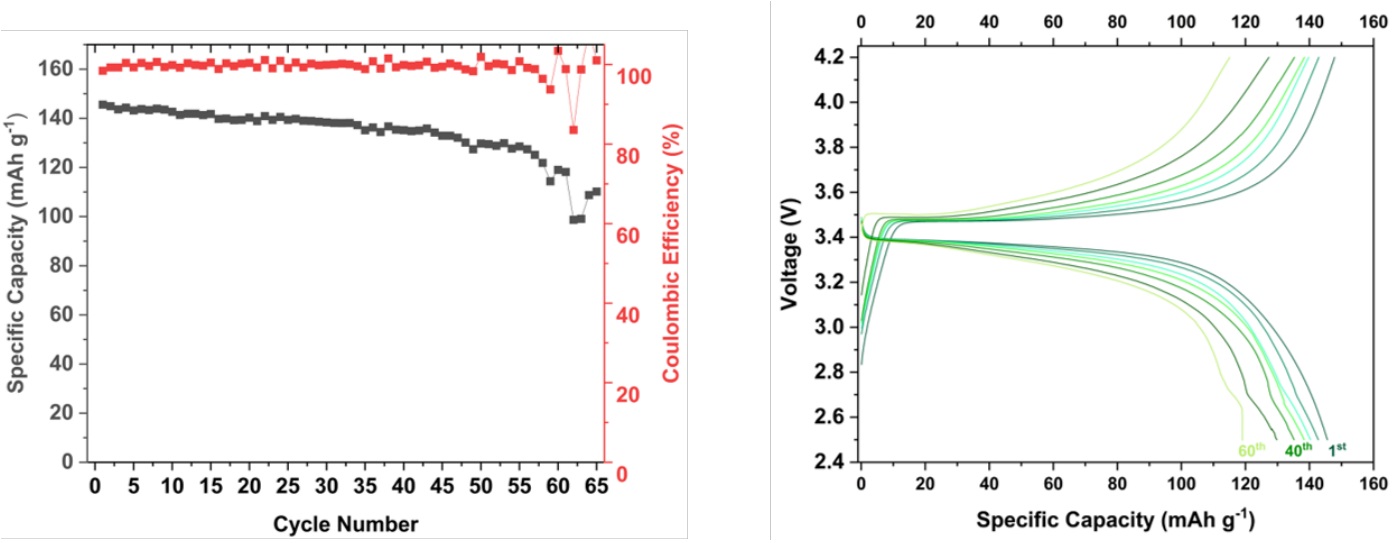

Figure 2 – LEFT – Specific capacity (left axis, grey squares) and coulombic efficiency (right axis, red squares) of the DSD pouch cell across 65 cycles at 0.2C on a liquid-electrolyte baseline. RIGHT – Voltage against specific capacity at intervals across the test, from the 1st to the 60th cycle. The flat lithium iron phosphate plateau at 3.4–3.5 V is retained throughout; the widening separation between the charge and discharge curves with cycle number is polarisation.

WHAT THE RESULTS SHOW

Sustained full-format cycling – A single full-format pouch cell, hand-assembled at laboratory scale – without the dry-room automation, calibrated stack fixtures or optimised formation protocols of a production line – cycled continuously and unattended for approximately 780 hours. The cell delivered approximately 145 mAh g^{-1} on its initial 0.2C cycles and approximately 110 mAh g^{-1} after 65 cycles – overall retention of approximately 75%. Capacity faded gradually through approximately 55 cycles, with a more pronounced decline over cycles 58–63. At no point in the month of testing did the cell lose its electrochemical identity: chemistry failures announce themselves quickly and unmistakably – collapsing plateaus, distorted voltage signatures, cratering efficiency – and none of these occurred at any stage.

The cathode chemistry remained active – The characteristic flat LFP voltage plateau at 3.4–3.5 V is present in every cycle of the test, consistent with the cathode's Fe^{2+}/Fe^{3+} redox chemistry remaining active throughout. Coulombic efficiency measures whether the lithium put into the cell during charge comes back out on discharge – it is the most direct readout of the electrode's own electrochemical integrity, and it is largely independent of the packaging around it. Near-100% efficiency for the vast majority of the test is consistent with the DSD cathode remaining electrochemically active while the cell around it aged. Initial capacity is also consistent with the approximately 157 mAh g^{-1} at 0.1C already reported for this pouch platform and the peer-reviewed coin-cell result for pure DSD-deposited LFP, allowing for the differences in rate and composition. Moving from coin-cell to full format commonly reduces accessible capacity – through

incomplete wetting, poor contact and inactive regions – and this cell was assembled by hand. Initial capacity was nonetheless consistent with the published coin-cell result.

Results indicate the fade is in the cell build and the baseline components, not the DSD cathode – As the cell aged, its internal electrical resistance rose – the battery equivalent of furring pipes: the pump (the cathode chemistry) still works, but more of the effort is lost pushing charge through the cell's plumbing. On the voltage curves this appears as the charge and discharge lines pulling apart and the flat plateaus shortening. Each identified engineering source of that rising resistance maps to a step performed by hand in this first-generation build: electrolyte wetting across the large electrode (manual filling), stack pressure (no calibrated fixture), cathode-to-anode alignment (manual stack assembly) and layer-to-layer contact (manual lamination). Hand-assembled pouch cells vary considerably from build to build for these reasons, and this result should be read as a single first-generation cell rather than a settled performance figure for the platform. The peer-reviewed study has already demonstrated that pure DSD-deposited LFP holds approximately 85% of its capacity over 500 cycles at coin-cell scale (the coin-cell work tested the LFP cathode alone, without the LLZO phase used in the pouch-cell matrix) – the DSD-deposited active material has demonstrated that durability at coin-cell scale; the cell build has not yet applied any of the standard engineering levers that may close the gap. Closing it is the purpose of the cell engineering optimisation phase now underway.

End-of-test behaviour – The sharper capacity decline and unstable coulombic efficiency over the final cycles indicate the cell was approaching end of life when the test concluded. Post-test inspection of the cell by the CEPS research team indicates that the decline is associated principally with degradation of the two baseline reference components – the liquid electrolyte and the lithium-metal anode – while the DSD-deposited cathode remained stable and intact. Degradation of lithium metal in contact with a liquid carbonate electrolyte is a well-documented characteristic of this baseline configuration, and is one of the reasons the Company intends to replace the liquid electrolyte with its ASE solid-state electrolyte as the next technical step in the program. That inspection is qualitative: a quantitative post-mortem analysis has not been undertaken, and the observation is reported as an indication of mechanism rather than a completed failure analysis.

***Figure 3** – LEFT – Post-test inspection of the cell: the lithium-metal anode shows heavy degradation, consistent with reaction with the liquid electrolyte, while the DSD-deposited cathode appears stable and intact on visual inspection. RIGHT – The full-format test cell.*

The Company reports this plainly: it is the expected behaviour of an unoptimised first-generation cell build, and – together with the month of stable cycling that preceded it – it defines the engineering baseline against which cell-build improvements will be measured. Cell assembly, formation protocols and electrode–electrolyte interfaces are optimisation levers with well-understood engineering solutions, none of which has yet been applied to this build. The Company notes that improving full-format cycle life is a development objective and that no assurance can be given that optimisation will achieve it.

IN PLAIN TERMS

A retention test answers a simple question: if you charge and drain a battery over and over, how much of its storage does it keep? This single, hand-built cell was cycled continuously for more than a month – 65 full charges and discharges – and finished with about three-quarters of its starting capacity. The test speed – a five-hour charge and a five-hour discharge – is the standard pace used across the industry for this kind of test, and roughly how a battery in a data centre or grid installation would be used day to day.

The results are consistent with the cathode chemistry doing its job the whole way through. The electrical signature of a healthy cathode was present in every single cycle, and almost all of the charge put in came back out. What the results indicate faded was the cell around it – the first-generation, hand-built assembly the cathode sits in, and the two off-the-shelf reference parts inside it: the liquid electrolyte and the lithium-metal foil. When the cell was inspected after testing, the lithium metal was heavily degraded while the cathode itself appeared intact.

The same DSD-built LFP material – tested there on its own, without the added electrolyte phase – has already held 85% of its capacity over 500 cycles in small laboratory reference cells. That points the research scientists to where to focus – not on the cathode material, but on the build and on the reference parts around it. Cell assembly is an engineering problem with known levers – and none of them have been used yet.

Is 75% a good result? On its own, no – a commercial cell holds more of its capacity for far longer, and the Company is not presenting this as a finished product. For a first, hand-built, laboratory prototype of a brand-new manufacturing process, sustaining a month of continuous cycling with the chemistry active in every cycle is the result that matters. Repeatability across further cells has not yet been established.

WHY THIS MATTERS FOR A LICENSING BUSINESS

Critical Resources' model is to develop and license battery materials and manufacturing-process intellectual property – not to manufacture cells. The value of that IP rests on a single proposition: that a solvent-free, single-step deposition process can build electrodes that perform. A cell maker evaluating a licence needs evidence not only that the electrode delivers capacity, but that it keeps delivering it under sustained use.

The program has now established that sequence in order. The active material survives deposition (refer ASX:CRR 5 March 2026). The complete composite layer – cathode, electrolyte and conductor – can be built in a single dry step (refer ASX:CRR 16 June 2026). That layer assembles into a working full-format cell (refer ASX:CRR 18 June 2026). The cell delivers near-theoretical capacity with structural recovery under load (refer ASX:CRR 16 July 2026). And a single cell has now sustained more than a month of continuous cycling with results consistent with its chemistry remaining active. In parallel, CSIRO is commencing Digital Twin modelling of the DSD deposition process at Lab22, Clayton, under a Kick-Start co-funded research collaboration (refer

ASX:CRR announcement 27 August 2026) – adding independent process modelling by Australia's national science agency alongside the experimental program at SDM. Each step narrows the technical risk a prospective licensee would be asked to carry, and widens the Company's licensing and partnership opportunity across the defence, aerospace, industrial and high-density computing markets it is targeting.

Critical Resources holds an exclusive option over a portfolio of solid-state battery patents developed at the South Dakota School of Mines & Technology – five granted US patents and one pending application (refer ASX:CRR announcement 18 November 2025). All new materials, processes and structures developed under the CEPS framework, including the dry-deposition work reported here, are being protected through filed provisional patent applications, reinforcing the Company's licensable IP position (refer ASX:CRR announcement 5 March 2026).

CRR's Amorphous Solid-State Electrolyte (ASE) – distinct from the LLZO reference electrolyte used in the DSD cathode matrix – has been benchmarked at 3.2 mS cm^{-1} ionic conductivity and 0.27 eV activation energy: superionic-class conductivity, competitive with sulphide-class performance, without sulphur, and among the highest reported for the non-sulphide, non-halide amorphous class from a first-pass, unoptimised composition (refer ASX:CRR announcement 28 May 2026). It is this material the program intends to integrate into the pouch-cell platform next, replacing the liquid electrolyte baseline.

CRR's optioned IP portfolio also includes a high-temperature solid-state electrolyte (HTE), covered by US Patent 10,991,976 and developed with NASA support (the US Government retains certain rights, as is standard for federally supported inventions). HTE is part of the Company's licensable IP position and does not form part of the pouch-cell work reported here; its planned role is later integration alongside ASE (refer ASX:CRR announcement 18 November 2025).

> **Critical Resources Managing Director, Tim Wither, commented:** *'Every battery manufacturing process in commercial use today has had to make this same journey – from laboratory reference cells to full-format cells – and these are our first steps on that path. More than a month of continuous cycling in a full-format, hand-built laboratory cell, with the cathode chemistry active in every single cycle, is exactly the result this stage of the program needed.'*
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> *'The gap between this cell and the peer-reviewed coin-cell result is genuinely useful. The published work has already shown our DSD-built LFP can hold 85% of its capacity over 500 cycles – so when the full-format cell fades sooner, the results point our research scientists to the cell build and the reference components around our cathode – the liquid electrolyte and the lithium anode – rather than the cathode itself. Prove the material, carry the capacity into full format, then engineer the cell up to the material – that is the right order, and it keeps each result clean and interpretable.'*
>
> *'We are equally clear about what this is not. Seventy-five per cent over 65 cycles is not a finished cell, and we are not presenting it as one – this is a first-generation, hand-assembled build, and we have not begun to optimise. These results are consistent with the cathode/electrolyte matrix material remaining active through deposition, which is a major milestone. This is a liquid-electrolyte baseline, not a solid-state cell; integrating our ASE electrolyte remains the next technical challenge. This remains early-stage laboratory work, advanced through a disciplined, capital-light evaluation approach, with outstanding work from the South Dakota School of Mines and Technology research team, and with CSIRO's Digital Twin modelling of the DSD deposition process now running alongside it.'*

NEXT STEPS

- **Cell engineering optimisation:** Refine cell assembly, formation protocols and electrode–electrolyte interfaces – including protection of the lithium-metal anode surface – to progress full-format cycle life toward the durability already demonstrated by the cathode material at reference scale.

- **Process optimisation:** Refine deposition parameters, layer thickness and conductive-network loading to address high-rate transport resistance, informed by the CSIRO Digital Twin modelling of the DSD deposition process commencing September 2026 (refer ASX:CRR announcement 27 August 2026).

- **Optimise and independently validate:** Submit the optimised baseline cell for independent third-party electrochemical testing to establish a validated performance baseline.

- **Integrate the solid electrolyte:** Replace the liquid baseline with CRR's ASE thin-film electrolyte – deposition is underway – building towards a full solid-state cell.

- **ASE and HTE via DSD:** Advance trials depositing the ASE and HTE electrolytes using the dry DSD process – the manufacturing endpoint that unifies the sulphur-free solid-state electrolyte with the DSD manufacturing workstream.

These activities represent defined technical gates within CRR's broader solid-state battery evaluation strategy, designed to systematically de-risk solvent-free manufacturing pathways while maintaining a disciplined, capital-light, laboratory-stage evaluation approach. Outcomes will inform prototype development strategy and downstream partnership, validation or licensing opportunities aligned with defence, industrial and high-reliability infrastructure markets.

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

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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 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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The scientific and technical information in this announcement relating to the solid-state battery program is based on, and fairly represents, information reviewed and approved by Dr Alevtina Smirnova, Director of the US National Science Foundation–supported Centre for Solid-State Electric Power Storage at the South Dakota School of Mines & Technology and Technical Advisor to Critical Resources. The underlying experimental work was conducted by the CEPS research team at the South Dakota School of Mines & Technology. Dr Smirnova has consented to the inclusion of this information in the form and context in which it appears.

FORWARD LOOKING STATEMENTS

This announcement may contain certain forward-looking statements and projections, including statements regarding the Company's solid-state battery technology and intellectual property programs, the scope, timing and outcomes of the CSIRO research project, the expected performance, optimisation and development of its electrolyte and manufacturing workstreams, the potential applications and markets for that technology, and the Company's plans with respect to its mineral properties and programs. Forward-looking statements can generally be identified by words such as 'may', 'expect', 'intend', 'plan', 'target', 'potential', 'anticipate' and similar expressions. Such forward-looking statements/projections are estimates for discussion purposes only and should not be relied upon. They are subject to known and unknown risks, uncertainties and assumptions and may therefore differ materially from results ultimately achieved. The benchmark assessment and laboratory results referred to in this announcement are early-stage and are not indicative of commercial performance. There can be no assurance that ongoing optimisation will achieve improved or commercially viable results, that the Company's battery technology will be successfully developed, scaled or commercialised, or that any intellectual property option held by the Company will be exercised or prove valuable. There can also be no assurance that CRR's plans for development of its mineral properties will proceed as currently expected, that the Company will be able to confirm the presence of additional mineral resources, that any mineralisation will prove to be economic, or that a mine will successfully be developed on any of CRR's mineral properties. Critical Resources Limited does not make any representations and provides no warranties concerning the accuracy of the projections and disclaims any obligation to update or revise any forward-looking statements/projections based on new information, future events or otherwise, except to the extent required by applicable laws. While the information contained in this announcement has been prepared in good faith, neither Critical Resources Limited nor any of its directors, officers, agents, employees or advisors give any representation or warranty, express or implied, as to the fairness, accuracy, completeness or correctness of the information, opinions and conclusions contained in this announcement.

REFERENCES

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