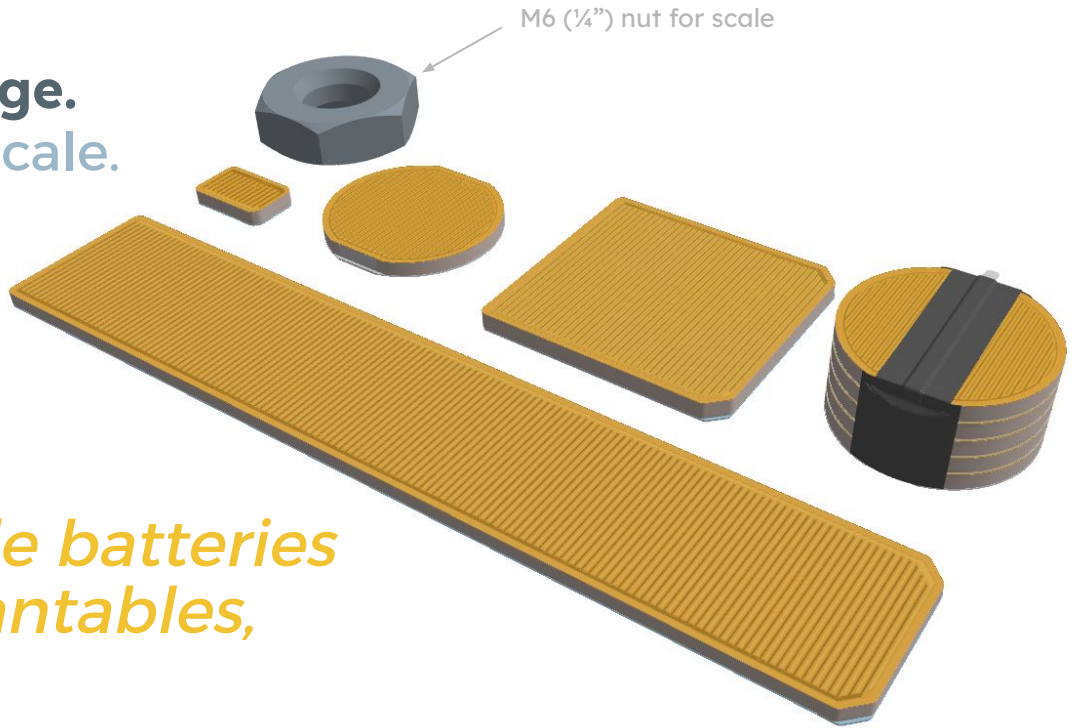
MOTIF Materials

To power the Intelligent Edge.

Solid-state energy at meso scale.



Printed rechargeable batteries for wearables, implantables, and IoT.

The problem:

Battery Technology Is Blocking the AI Wearables Revolution

SIZE

Until batteries shrink, wearables won’t disappear

Every smart ring, earbud, and glasses frame is engineered around its battery — not the human body

PERFORMANCE

AI demands more than batteries can supply

Always-on sensing, edge inference, and continuous connectivity are too much for today's small batteries

MANUFACTURABILITY

Liquid electrolytes can't survive PCB assembly

Batteries that explode at reflow temperatures must be added after PCB assembly — a costly break in the production flow

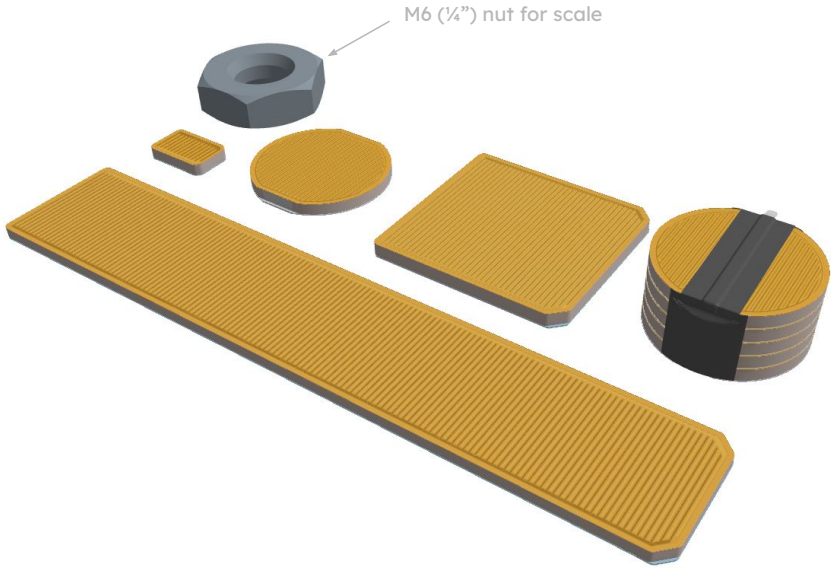
COST

Solid-state batteries cost too much for wearables

At $30/mAh, today's SSBs are priced for defense — leaving wearable designers no choice but Li-ion

The solution:

MesoCell ™ by MOTIF Materials



0.5-100 mAh @ 3.6V · near-0 self-discharge · Autoclave sterilizable

5-10x
SSB ENERGY DENSITY

MVP Target: 5x; architecture path to 10x

Any shape - thin as 0.5mm
FORM FACTOR FLEXIBILITY

MVP Target: some tooling required. Print to order at scale.

SMT- & Reflow-ready
HIGH TEMPERATURE CAPABLE

Medical device manufacturer offered 50% price premium for reflow-compatible battery.

<$0.01/mAh at scale
LOWEST COST

MVP Target: $0.05/mAh – below mini-Li-ion No solvents, high yield, highly productive capital eqt.

The technology:

MOTIF MesoCell ™ Technology

Meso Scale: the size regime where batteries have never worked well — too small for conventional manufacturing, too large for thin-film deposition. MOTIF's EP process is the first to crack it.

Geometry, Not Chemistry

MesoCell uses established solid-state chemistry. The energy-density gain comes from the structure: a 3D interdigitated electrode geometry that optimizes conductive paths and multiplies active-material utilization.

The Only Process That Can Build It

Vapor deposition (CVD, ALD, sputtering) — used by every solid-state incumbent — cannot create 3D interdigitation. MOTIF's electrophotographic (EP) dry particle deposition builds 3D roll-to-toll with high yield.

Manufacturing DNA: TRL9 Already Proven

At Evolve Additive Solutions, MOTIF's team scaled EP 3D deposition to TRL9 – commercial production across multiple structural material systems — meeting stringent repeatability, reliability, and TCO requirements. The process is proven; battery integration is the work ahead.

IP: New to World and Protected

MOTIF holds the only patent claim on electrophotographic deposition of inorganic structures — new to world.

Characteristic	Ilika Stereax M300	Mini Li-ion Pouch	MOTIF MesoCell
Chemistry	Solid-state	Liquid electrolyte	Solid-state
Footprint (mm)	5.6 x 3.6 x 1.1	16 x 15 x 5	As required
Energy Density (Wh/l)	50	210	400
Producer cost per mAh*	>>$50	$0.08	$0.05 (pilot), <$0.01 (scale)
Architecture	Stacked laminar	Folded laminar	3D interdigitated
Manufacturing	Vapor deposition	Slurry deposition	Dry-particle electro-photography
SMT/reflow	Yes	No	Yes

*MesoCell cost = direct COGS, modeled from material costs and Evolve process parameters. Excludes overhead and margin.

The market:

Enabling Four High-Value Verticals

Consumer Wearables

Smart glasses · Earbuds · Smart rings

SMT-compatible batteries that are 20–50% cheaper than Li-ion and twice the energy density at small scale—enabling thinner, lighter, longer-lasting consumer devices.

Industrial IoT

RFID tags · Sensors · Asset tracking

Zero self-discharge + energy harvesting + 250°C tolerance = truly maintenance-free sensors deployable in any environment, indefinitely.

Healthcare & Medical

Implantables · CGM/insulin · Cardiac patches · Neural interfaces

Autoclave-sterilizable batteries with custom form factors — enabling wireless-rechargeable implants, extended-wear monitoring patches, and continuous diagnostic devices.

Defense

Soldier wearables · Smart munitions · Asset tracking

20-year shelf life, energy-autonomous with harvesting, damage-tolerant and inherently safe for munitions and on-soldier applications

The market:

Four segments · $5B addressable by 2031 · 20%+ CAGR

Based on existing battery technologies – MOTIF unlocks more demand

AI Wearables — Beachhead '27

~$2.0B 25% CAGR

Target spec	15–50 mAh · smart rings & glasses
MesoCell ASP	$0.10/mAh · below Li-ion at pilot
Unit growth	6.4M smart ring units in 2026 · +49% YoY

Samsung wants SSBs for Galaxy Ring 2 — current SSB pricing prohibitive. MesoCell is the first affordable option.

Industrial IoT — Phase 1 expansion

~$900M 20% CAGR

Target spec	1–50 mAh · sensors & trackers
Key enabler	Near-zero Vsd + harvest & store
Temp range	250°C rated · oil, gas, aerospace

Energy harvesting in IoT growing at 35% CAGR — market moving to harvest+store architectures MesoCell enables.

Med Device — Post-pilot · high margin

~$1.2B 12% CAGR

Target spec	1–100 mAh · implants, wearables
USPs	Autoclave sterilizable · wireless recharge
Current pain	Surgical replacement every 5–7 yrs for battery

Abbott Diabetes Dir. Engineering: WTP +50% for reflow-compatible battery at 10M units/yr.

Defense Micro — SBIR entry · high ASP

~$460M 9% CAGR

Target spec	5–50 mAh · smart munitions · asset tracking · sensors
MesoCell ASP	$0.25–0.50/mAh · 3–5× wearable rate
Key specs	20-yr shelf life · –10° C to 250°C

DoD $1.65M grant to NanoGraf (Dec 2025) for portable military gear batteries — active procurement validated.

MARKET ENTRY SEQUENCE

Now
Pre-seed · design win outreach · SBIR prep

Aug 2027
Lab demo validated · seed closes · pilot build begins

May 2028
First MVP batteries shipped · wearable & defense revenue begins

Aug 2028
Series A closes · commercial line build starts · medical qualification

Aug 2028→2030
IoT design wins · defense contracts · expanding pilot revenue

Aug 2030
Gen 2 commercial line · first commercial shipment · ~$35M /yr/line

The market:

Addressable Market: Beachhead and Expansion

PRIMARY BEACHHEAD: 2027

AI smart ring startups

~$5M SAM

- ~12 funded startups at or near production
- 15–30 mAh/device
- MesoCell is the only affordable SSB
- ASP $0.10/mAh at 50% GM

NEAR-TERM EXPANSION: '27–28

Defense micro-electronics

~$3.5M SAM

- Smart munitions
- Soldier sensors
- Battlefield IoT
- ASP $0.25-$0.50/mAh
- SBIR entry adds $500K–$2M non-dilutive

STRATEGIC OPTIONALITY '28+

IoT sensor startups

140 funded

- 529 total startups
- 52 at Series A+
- Near-zero self-discharge unlocks perpetual-operation sensors not currently feasible with Li-ion

WEARABLE/DEFENSE SAM - BOTTOMS-UP

Funded ring startups (addressable)	~12
Avg production (mid-case)	200k units/yr
Battery: 20 mAh x $0.10/mAh	$2.00/ring
Wearable SAM	~$4.8M/yr
Defense SAM (startup wins + SBIR)	~$3.5M/yr
Combined SAM	~$8.5M/yr

DEFENSE - BY CHANNEL

Army/AFWERX SBIR Phase I/II	$500K–$2M non-dilutive
Active micro-power topics	3–4 open now
Startup design wins	2–3 OEMs
Defense ASP	$0.25–0.50/mAh
Revenue/win vs wearables	3–5× higher
Defense SAM contribution	~$3.5M/yr

PILOT SOM

$2.5M

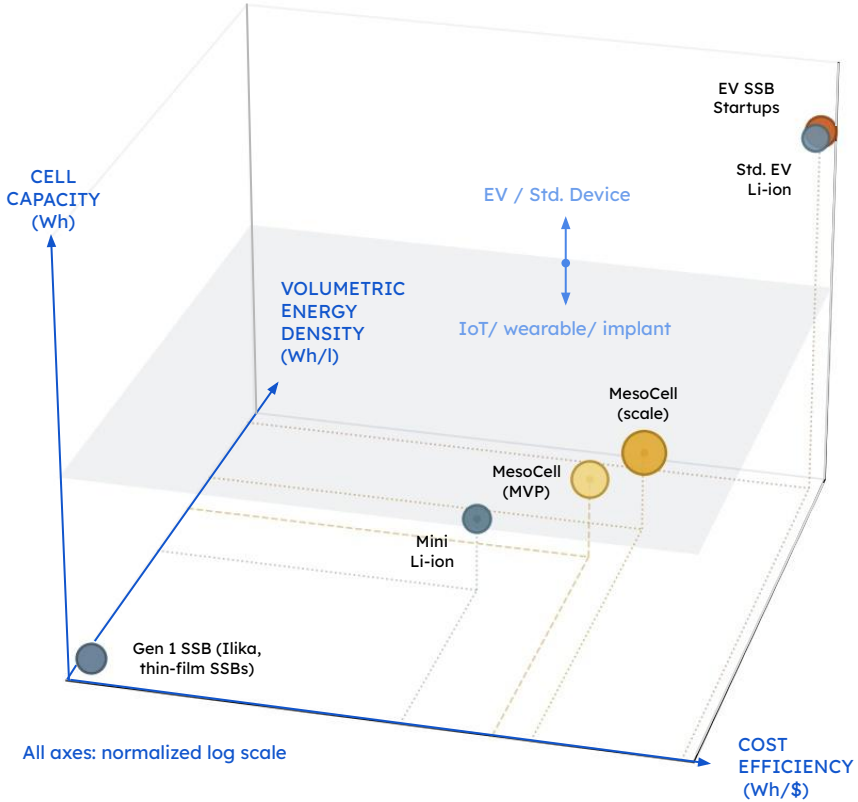
per year · paced by 15M mAh pilot capacity

SOM is 29% of combined SAM

Defense premium adds $1M+ to pilot revenue vs wearables-only — without requiring additional capacity.

The competition:

Not the Same Race



Why no one else reaches MOTIF's corner:

1000x scale difference vs EVs

EV-focused SSB startups achieve high energy density — but only at >10Ah scale. At sub-100mAh (IoT, implant, wearable), they don't exist. MOTIF and QuantumScape are not competing

Process ceiling for SSB incumbents

Vapor deposition physically cannot build 3D interdigitated structures at any scale. Every SSB incumbent is architecturally constrained — no R&D spend changes this.

EP is the key

Dry particle electrophotographic (EP) deposition builds meso-scale 3D geometries cheaply and flexibly. MOTIF's team has already taken this process to TRL9 at Evolve — and holds the only patent claim on EP deposition of 3D inorganic structures.

The business model:

Exceptional Capital Efficiency

~$35M	$3M	>80%	11.6×
revenue per Phase 1 line/yr	Phase 1 line capex	gross margin on Phase 1 battery sales	revenue / capex

PILOT: PRE+SEED CAPITAL

MVP Launch

- 15M mAh/yr capacity · $2.5M revenue
- Pilot wearable wins in ring-specific form factors
- 6–8 design wins fund the seed round
- Validates TCO model with real production data

PHASE 1 · BATTERY MANUFACTURING

Scale to $35M per line

- 21 months from pilot line → first Phase 1 line post-seed
- 2.5 MWh/yr per line · <$0.01/mAh COGS · $0.05/mAh ASP
- $3M line capex · recovers in ~6 weeks at operating rate
- Multiple form factors from a single line — no tooling, rapid iteration
- Design-win reference base drives Phase 2

Phase 2: Systems + Materials

The strategic flywheel

- Large OEMs bring manufacturing in-house — MOTIF sells complete EP production systems
- Proprietary feedstock materials: OEMs can only source from MOTIF · recurring high-margin revenue
- Every Phase 1 customer is a potential Phase 2 system sale
- Licensing compounds on top of continued bespoke battery supply

Traction & validation:

Early Market Signal, Process, and IP

MARKET FEEDBACK

Neuralink implant engineering team (3 engineers) requested MesoCell specification sheet for active implant battery evaluation — April 2026

TDK InvenSense CTO described MesoCell as 'accelerating the smart glasses market flywheel' — offered venture team introduction at Sensors Converge — May 2026

Abbott Diabetes Care Dir. of Engineering expressed WTP at $0.30 vs. $0.20 current (+50%) for reflow-compatible battery at 10M units/year production scale — May 2026

MANUFACTURING PROCESS: TRL9

- Team scaled electrophotographic 3D deposition to full commercial production at Evolve Additive Solutions — across multiple structural material systems.
- Met stringent repeatability, reliability, and TCO requirements for industrial manufacturing. Battery application is less demanding on all these dimensions.
- TCO model: hardened at Evolve + conservative assumptions for battery-specific unknowns.

INTELLECTUAL PROPERTY

- Broad provisional application filed — establishes priority date.
- 3+ NPAs in preparation: materials, cell architecture, manufacturing method & apparatus
- Core claim: EP deposition of inorganic materials – new to world
- FTP confirmed for initial development phase.

The team:

World-Class Team

Manufacturing operators, materials scientists, and systems engineers — with the experience of taking both functional EP and SSBs to TRL9.

JOHN LEES
CEO
Former VP Sales & VP Engineering/Ops, Evolve Additive Solutions — rare combination of commercial and deep technical scale-up experience in advanced manufacturing. Evolve, Tetra Pak, Optomec, Bosch. MTM, Chalmers University.

BRIAN HAYDEN
CTO
University of Southampton Emeritus Professor of Chemistry. Founder & former CSO, Ilika Plc. Pioneering work in combinatorial materials science and solid-state battery development. The foremost academic authority on SSB architecture.

GARY JOHNSON
VP Business Development
BD at CorTec, Microdul AG. Strategy & marketing for wearable medical devices, ultra-low-power wireless ICs, and implantable device technology. Former Sales Director, Ilika. BSEE, University of Minnesota.

ROD BUCKS
Sr. Technologist – Imaging & EP
PhD Physical Chemistry, Stanford. Former Senior Scientist, Kodak. Leading innovator in electrophotography. Led adaptation of EP to 3D polymer printing at Evolve — the core process MOTIF now applies to batteries.

ZEITER FARAH
VP Engineering
VP Engineering & Operations, Evolve Additive Solutions. Led commercialization of electrophotographic 3D polymer printing at scale. Master of Systems Engineering, University of Minnesota.

ALEX KOSSETT
System Architect
President, Kossett Engineering. Former Principal Systems Engineer, Evolve. 20+ years developing high-performance mechatronic and manufacturing systems. Licensed PE, MSME, University of Minnesota.

The raise:

Pre-Seed Round – $1.5M

(Plus $250k gov non-dilutive and $150k friends & family co-investment) · 12-month runway

Use of Funds ($k)	Team Labor	H/W & Mat'l	Services	Facilities misc.
Develop electrode materials	200	160	50	
Develop lab-scale printer	150	120		
Design/build test fixture	100	80		
Develop, validate demo battery	280	50	50	
Concept design pilot plant	75			
Total (incl G&A)	1050	400	250	60

At the end of 12 months:

- Lab-demo batteries validated. 5× energy density + 1/20 SSB cost. De-risks breakthrough elements: printed interdigitated electrodes and solid electrolyte.
- Pilot system defined and ready to design/build. Lab demo validates printing method and materials. Completing pilot system only requires encapsulation and a bit of automation.
- Design partner in qualification. 2+ OEMs in active conversations — commercial pipeline established.

Seed Round – $4.5 M

Pilot-scale manufacturing system · 12-month build → $5M revenue per $0.5M line

The vision:

To power the Intelligent Edge.

An era where intelligence lives in, on, and around us —
always present, always powered, truly invisible

Made possible by the world's first manufacturable, affordable solid-state battery.