



Acquisition of Xenica: A Scalable Path to Commercial-Grade MXenes

Licence and production pathway to a supply-constrained material

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Executive Summary



Company Overview

ECT is advancing its strategy of building a diversified portfolio of high-impact, disruptive technologies, developed in collaboration with world-leading researchers

Acquisition

ECT is acquiring 100% of Xenica Materials Pty Ltd (Xenica) for 60m ECT shares (six months' voluntary escrow) as the next part of this strategy. Xenica holds an exclusive licence from Rice University to use Rice's patented Flash Joule Heating (FJH) technology for the synthesis of MXenes and 2D amorphous carbon

MXenes Value

MXenes are a family of next-generation 2D materials with highly tunable, attractive properties and broad applicability. Adoption has been limited by constrained supply due to high costs, harsh acids used, and length of time of production, but FJH offers a scalable, low-cost and clean path to unlock broader use

Metallium Partnership

In connection with the acquisition, ECT has entered into a 12 months R&D and engineering agreement with Metallium Limited (ASX:MTM). MTM has a licence from Rice to use FJH to extract valuable metals from waste material and has spent significant funds and time into developing the FJH technology including a reactor system. The agreement will fast track ECT's development of its FJH MXene production strategy

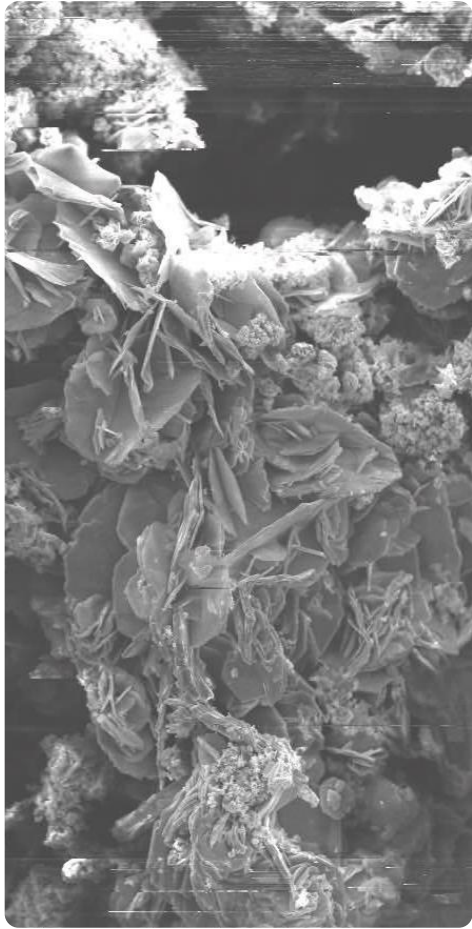
Capital Raise

ECT has received firm commitments to raise A\$12.0 million via a 2 tranche placement at \$0.12 per share. T1 shares will be issued under ECT's existing Listing Rule 7.1 and 7.1A placement capacity and will raise \$10.6 million through the issue of 88.7 million new fully paid ordinary shares. T2 is subject to shareholder approval and will raise the balance of \$1.4 million through the issue of 11.3 million shares. Funds to be used for development of new technology (FJH for MXenes), development of existing technologies (FJH for PFAS remediation and COLDry) and working capital

What ECT Is Acquiring



100% of Xenica Materials; the rights and relationships to commercialise MXenes via FJH



The Transaction

ECT is acquiring 100% of Xenica Materials for 60m ECT shares (six months' voluntary escrow); subject to shareholder approval

Rice University Licence

Xenica holds an exclusive licence from Rice to use Rice's patented FJH technology for the synthesis of MXenes and 2D amorphous carbon, along with its precursor MAX phases

Sub-licence Negotiations

MXenes were discovered by Drexel University who holds various patents over MXenes, with production for commercial use subject to licensing requirements. Xenica has identified MXenes for military end use as a key market target and is in advanced discussions to secure a licence to enable it to produce MXenes for this end use

Manufacturing Pathway

ECT has partnered with Metallium to gain access to the company's permitted Gator Point FJH facility to research the commercial potential for MXene production

Why This Fits

ECT's existing FJH platform, already proven in PFAS remediation and currently being scaled in its pilot development program, now unlocks a new, high-value application

Structure & Financing



ECT to acquire 100% of Xenica, holder of an exclusive licence with Rice University to use Flash Joule Heating for the production of MXenes

Acquisition Consideration



60M

ordinary shares

Escrow Terms & Conditions



All Consideration Shares are subject to a six-month escrow from issue

Transaction subject to shareholder approval

Capital Raise



\$12M

placement to sophisticated and institutional investors.

100M

new shares issued at \$0.12/share

Use of Funds



- Development of new technology (FJH for MXenes)
- Development of existing technologies (FJH for PFAS remediation and COLDry)
- Working capital

MXenes: The Xenica Acquisition



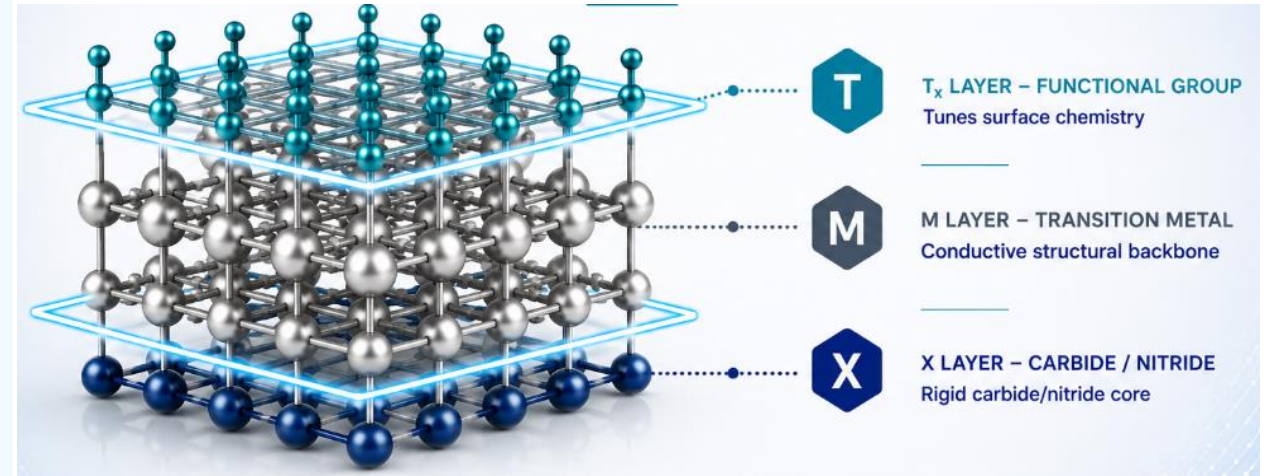
What are MXenes

A high-performance 2D nanomaterial at the centre of the Xenica licence

What they are

- 2D nanomaterials derived from a MAX phase precursor
- Highly customisable with a rare combination of properties in a single material
- Standout properties including high conductivity, hydrophilicity & versatile surface chemistry
- Deployable as ink, film, powder or coating or combined with other materials
- Discovered at Drexel University (2011), which holds the composition-of-matter patent

Atomic Structure & Key Applications



KEY POTENTIAL APPLICATIONS


**EMI
Shielding**


**Energy
Storage**


**MXene
Sensors**
(eg biosensors)


**Water
Purification**

Customisable at the atomic level – a different composition for almost any application

Why MXenes Matter Commercially

Premium demand pools exist today, but reliable supply does not

The commercial case

- High-value product forms, including ink, film, powder and coatings, can drop into existing product designs at a premium
- Existing demand pools across EMI and IR shielding (defence), energy storage, sensors and water filtration
- Tunable by design and able to be engineered for the target application, one material family, varied end-products
- Current bottleneck is production, not utility, with demand signals (patents, agency funding, corporate programmes) outrunning supply – traditionally hard-to-scale and costly production has confined the market
- Acquiring the FJH pathway, which removes the production bottleneck through low-cost, scalable production, unlocks value currently trapped by supply constraints



High Electrical Conductivity

Conducts electricity exceptionally well – ideal for electronics and energy storage while absorbing and dispersing incident EMI frequencies



Hydrophilicity

Surface groups let MXenes mix with water, enabling filters, membranes and pollutant removal



Thermal Conductivity

Conducts heat efficiently – valuable for thermal management in electronics



Low IR Emissivity

Reflect and absorb infrared rather than emitting it – effective at masking heat signatures

A company that can achieve cost-effective, commercially scalable MXene production won't just capture an existing market; it will unlock and expand the market's true size

Locked by Legacy Processes

Incumbent manufacturing processes cannot scale, creating a clear opportunity for the FJH pathway

	Legacy Approaches			FJH
	CVD	Hydrofluoric Acid	Fluoride-Free	
Output per batch	<0.1 g	10–100 g	1–10 g	~250 g
Total time per batch	~15 mins–2 hrs	~48–72 hrs	~12–24 hrs	30–90 mins
Scalable	✗	–	–	✓
Safe & non-toxic	–	✗	✗	✓
Cost-effective	✗	✗	–	✓
Good shelf life	✗	✗	–	✓
Varied Chemistries	✓	✗	✓	✓
Purity	✓	✓	✗	✓

US\$100+ /g

selling price for high-quality US-produced $\text{Ti}_3\text{C}_2\text{T}_x$ powder

~80%

reduced processing costs for FJH vs incumbent methods

Repeatable, high quality

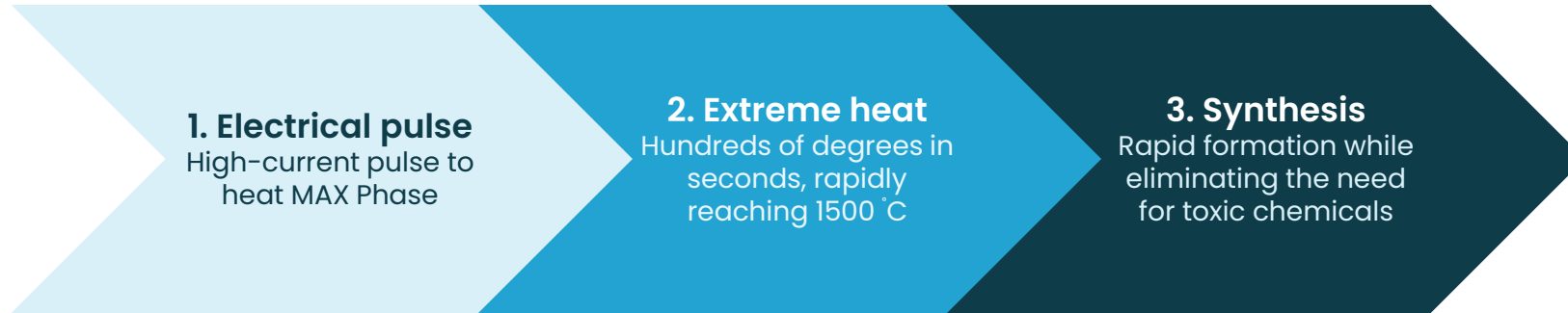
FJH MXenes demonstrated and validated by independent third-parties

The market has been trapped at laboratory or small-scales with slow, hazardous, inconsistent and expensive chemistry capping market growth



Unlocking MXene Production at Scale

FJH replaces a multi-day hazardous batch chemistry process with a rapid, cleaner process suited to scalable commercial supply



Faster

Lower energy

Cheaper

30-90 min processing time drives production efficiency, which is how MXenes become manufacturable at scale

CASE STUDY

Universal Matter

- Rice University / Tour Lab spin-out commercialising FJH - the same process platform
- Flashes low-cost carbon into >99% pure turbostratic graphene in under a second
- Backed by Westlake Corp who supply graphene at industrial scale for asphalt, cement, rubber and coatings
- Evidence that FJH scales from lab to industry - the pathway for MXenes

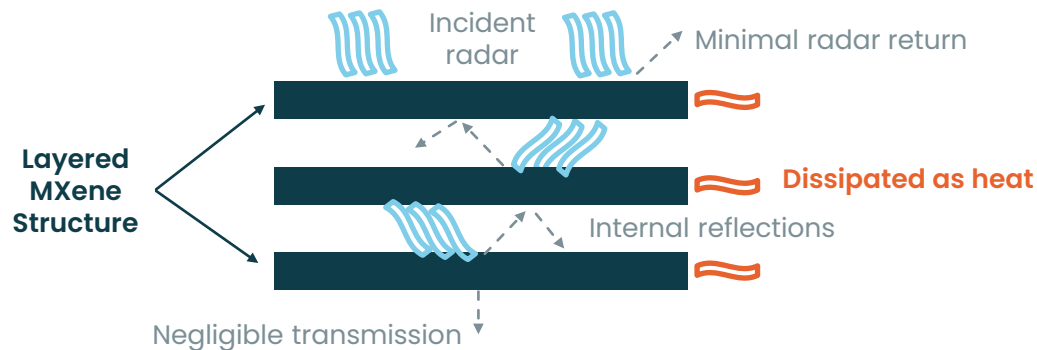


Defence: First Target Commercial Market ›

Where strong, price inelastic demand resides

- › **Licensing Requirements:** Drexel University holds various patents over MXenes, with production for commercial use subject to licensing requirements. Xenica has identified MXenes for military end use as a key market target and is in advanced discussions to secure a licence to enable it to produce MXenes for this end use.
- › **Why defence first:** Premium demand already exists with the radar-absorbing materials market expected to reach US\$4.3bn by 2033, of which defence ≈47%.⁵
- › **The problem MXenes solves:** Modern detection spans radar, infrared and visible light. A one-micron-thin MXene coating delivers shielding, IR camouflage and thermal management together, and can be applied to almost any surface.¹
- › **Early scalability:** Defence procures qualified material in kilogram quantities at premium prices, allowing revenue to begin well before mass-market volumes are required.
- › **Observed, real contracts:** Bulk purchase orders from US DoW contractors already exist, highlighting that defence demand is contracted, not hypothetical.⁴

How MXenes avoid radar detection



Supporting Use-Cases³



EMI Shielding & Stealth

Micron-thin films that block EMI and suppress radar and infrared signatures
- 45 dB shielding at 0.4 mm²



Smart Impact Protection

Armour and helmet liners that sense damage in real time



Rugged Energy Storage

Soldier-worn and platform power that survives heat, cold and shock in the field while affording fast charging



Sensing

Conformal sensors for uniforms, vehicles and unmanned systems

Scaling MXenes

The scale-up path utilising Metallium's permitted Gator Point facility

Capital-Light Model

immediate access to an established, permitted FJH reactor reduces capital requirements

Speed to Market

established facility and operating know-how accelerate pathway to first production

Initial Production of 250g batches

produced in 30-90 minutes, demonstrating rapid MXene synthesis (third-party facility data) with ability to scale further



Metallium Ltd — Flash Joule Heating reactor (test unit).

Why ECT Wins Here

An assembled path to market combining IP, manufacturing access and scale into a practical route to first product

PROCESS ADVANTAGE

FJH: minutes, not days

Fast, acid-free synthesis in ~30-90 minutes on a validated platform – a cheaper path to commercial supply

PROVEN TECHNOLOGY

Built to scale

FJH process already scaled by Universal Matter and Metallium Limited, de-risking technical path to market

ECT

the assembled path to first product

LICENCE · PROCESS

Rice University

Exclusive licence to FJH MXene synthesis – the foundation of the production pathway

✓ SECURED

SERVICES R&D AGREEMENT · SCALE-UP

Metallium Limited

Existing infrastructure and know-how accelerate scale-up – validated results already achieved

✓ SECURED

SUB-LICENCE · ROUTE TO REVENUE

In discussion

Sub-licence connects ECT to the exclusive military demand channel

Opportunity Beyond Defence

Civilian adoption is gated by scalable supply not demand

- › **Consumer electronics:** Samsung, LG and Murata have explored MXene electrodes to replace brittle ITO in displays; EMI shielding for densely packed 5G devices
- › **Energy storage:** Supercapacitors and fast-charging microbatteries exploit MXenes' record volumetric capacitance – US\$40m+ of DoE funding since 2023
- › **Medical & bioelectronics:** Datasea announced development of Mxenes in brain-computer-interface electrodes (Jan 2026); biosensors and wearables following the same path
- › **Industrial & filtration:** conductive coatings, composites, water-purification membranes and thermal management open volume markets below US\$30/g

Scalable, low-cost production does not merely capture this market; it has the potential to expand it, because today's forecasts are built on today's supply constraints



Samsung display



Supercapacitor



Brain-computer-interface electrodes

Medium-Term Potential Markets



Opportunity of adoption in large commercial markets



EMI shielding
market USD (2026)
\$8.7 bn

Electronics¹

- › Matches copper shielding at 1/20th the thickness, protecting electronics without extra bulk or weight
- › Absorbs electromagnetic energy rather than reflecting it, reducing self-interference, signal leaks and security risks
- › Can be coated on almost any material



PFAS treatment market
USD (2026)
\$3.0 bn

Water Treatment²

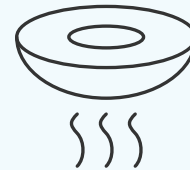
- › Raises PFAS rejection from 72% to over 96%
- › Captures short-chain PFAS that slip through carbon filters, the most-regulated ones to remove
- › Cleans nearly twice as much water as carbon, having both higher purity and faster output



Supercapacitor
market
USD (2025)
\$1.4 bn

Energy Storage³

- › Up to 10x the energy density of surface-only carbon supercapacitors
- › Unlocks fast-charge batteries: supercapacitor speed, battery capacity
- › Holds up over thousands of cycles, matching carbon's durability



Flexible sensor market
USD (2024)
\$6.5 bn

Sensors⁴

- › Bends and stretches with skin without cracking or losing signal
- › Incumbent material, cracks and loses signal under repeated bending, ruling it out on body worn devices
- › Runs at room temperature avoiding heat and power drain of conventional sensors

ECT's Technology Portfolio



The MXene licence adds to ECT's growing portfolio of innovative, scalable technologies



MXenes via FJH (following completion of the Xenica acquisition)

Exclusive licence to synthesise MXenes and 2D amorphous carbon using Flash Joule Heating

NEW



REM

Rapid Electrothermal Mineralisation, licensed to destroy PFAS in soil and granular activated carbon

IN TESTING



COLDry

Drying and pelletising technology currently progressing through commercialisation review

IN REVIEW

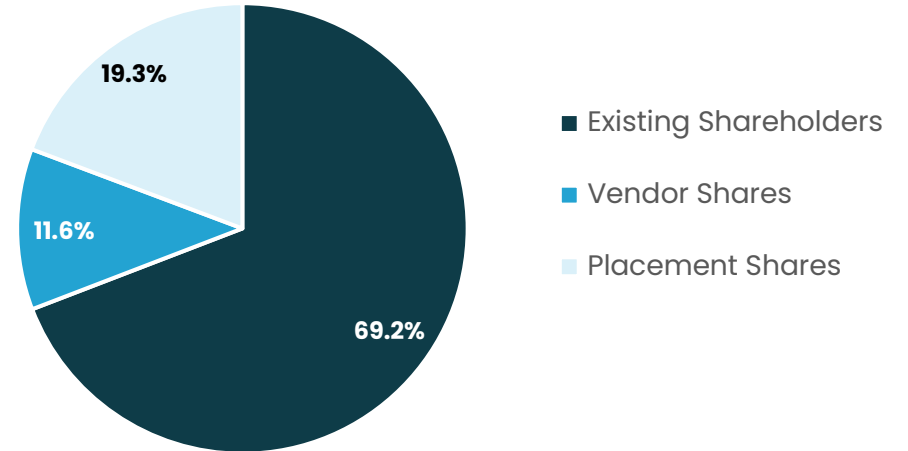
ECT will continue developing its technologies and pursuing complementary acquisitions, building a diversified portfolio of innovative, scalable technologies

Capital Table, Sources & Uses



SOURCES OF FUNDS		\$m
Placement		\$12.0m
TOTAL SOURCES		\$12.0m
USES OF FUNDS		\$m
Development of new technology (FJH for MXenes)		\$4.5m
Development of existing technologies (FJH for PFAS remediation and COLDry)		\$4.5m
Working Capital		\$3.0m
TOTAL USES		\$12.0m

Ownership Post-Raise



	SHARES	%
Existing Shareholders	358,839,231	69.2%
Vendor Shares	60,000,000	11.6%
Placement Shares	100,000,000	19.3%
TOTAL	518,839,231	100.0%



Thank You



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