Environmental Clean Technologies ASX:ECT

COMPANY UPDATE · INDUSTRIALS

ECT adds second commercialisation platform

ASX:ECT · Sector: Industrials · 16 September 2026 Share Price **A$0.115**

Environmental Clean Technologies (ASX:ECT) has entered a binding agreement to acquire 100% of Xenica Materials Pty Ltd following a A$12 million capital raise, adding a potentially high-margin speciality materials platform to its PFAS business. Through Xenica, ECT has secured exclusive Flash Joule Heating (FJH) based MXene production rights and a sublicence to sell MXenes into military and defence end-markets. The investment case now centres on premium MXene sales into US and Australian defence markets, where these lightweight, conductive materials could be used for EMI shielding, radar absorption and infrared-signature reduction in defence aerospace platforms. We believe these applications could support premium pricing and develop into a high-margin business if ECT successfully scales production and qualifies its material with defence customers.

Tunability Is MXene's Core Advantage for the DoD

What makes MXenes particularly compelling for defence applications, and why the DoD is taking an interest, is their tunability. There are currently more than 18,000 research publications, with scientists clearly demonstrating that MXene structures can be adjusted to optimise electrical performance, even exceeding copper, graphene and graphite in areas detailed throughout this report. This ability to engineer specialised materials is what supports premium pricing, with high end MXenes commanding around US$400 per gram.

Capital-Light MXene Scale-Up Targets Defence and EMI Shielding

ECT's capital and production strategy is to partner with Metallium (ASX:MTM) to access its modular FJH reactors, providing a potentially capital-light and faster pathway to MXene production without building manufacturing infrastructure from scratch. Revenues from this speciality materials business are intended to be reinvested into ECT to help fund its long-term PFAS destruction platform, which remains the centrepiece of the investment thesis. In this way, the MXene business could support ECT's growth while reducing its reliance on external capital raises.

Our sum-of-the-parts valuation increased to A$0.28–A$0.36 from A$0.21–A$0.27

Our updated sum-of-the-parts valuation increased to A$0.28–A$0.36 per share from A$0.21– A$0.27. This reflects ECT's MXene speciality materials business while accounting for the higher share count following the recent capital raise. Investors can find our valuation methodology on page 24 and key risks on page 29.

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Key Metrics

Market cap. (A$m)	51.6
Shares outstanding (m)	448.5
Shares fully diluted (m)	589.3
Market cap ful. dil. (A$m)	67.8
Free float	86%
52-week high / low (A$)	0.20/0.06
Avg. 12M daily volume ('000)	628.5

Share Price (A$)

Source: Refinitiv Eikon, Pitt Street Research

Disclosure: Pitt Street Research directors own shares in ECT.

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The investment case for ECT's MXene opportunity

1. **ECT is creating a new potential revenue stream through a speciality materials platform**, targeting premium MXene production for the defence market where pricing and margins can be among the highest. The DoD's interest is driven by MXenes' ability to be applied as lightweight, high-performance coatings. ECT plans to utilise this premium market to pursue a capital-light model, with potential MXene profits reinvested into its longer-term PFAS platform.

2. **MXenes are a highly adaptable class of advanced materials because engineers can fine-tune their atomic structure** to achieve specific performance characteristics. By adjusting variables such as electrical conductivity, chemical stability, flexibility and electromagnetic interference (EMI) shielding, MXenes can be engineered around the requirements of a particular application.

3. **The key advantage MXenes hold over conventional conductive materials** such as copper, silver and graphite is their ability to be applied as thin, lightweight coatings across complex geometries and irregular surfaces without sacrificing electrical performance. This combination of high conductivity, low weight and design flexibility makes MXenes particularly attractive for high-value applications in aerospace and defence electronics.

4. **The MXene market is currently estimated at approximately US$50–75 million and is growing at around 36% CAGR**, supported by strong demand but constrained by limited supply and production methods that have yet to reach meaningful economies of scale. As a result, MXene pricing can range from roughly US$100 to US$400 per gram, depending on formulation, purity and performance requirements. Over time, we expect the market to increasingly split between premium, application-specific MXene formulations commanding higher margins and more commoditised grades as production scales and costs decline. This premium market is ECT's core strategic focus.

5. **ECT has strengthened its pathway into the US defence market**, with Xenica securing a sublicence to produce and sell MXenes to military and defence customers. This adds another key piece to ECT's MXene strategy, alongside its FJH production rights, and access to Metallium's reactors, ECT can now legally sell these MXenes to the US DoD. However, the sublicence does not mean immediate revenue, with sales still dependent on successfully scaling production and qualifying the material with customers.

6. **ECT is partnering with Metallium to develop a new MXene production pathway using Flash Joule Heating**, giving ECT access to Metallium's modular reactor platform without having to fund and build the production infrastructure independently. Early feasibility studies are encouraging, with MTM demonstrating MXene output in small quantities, and targeting a near-term scale-up to 500g-1kg of MXene per day. This provides a more capital-efficient pathway to increase production while progressively de-risking the commercial scale-up process.

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Why MXenes could become a critical advanced material

MXenes are a recently new discovery of advanced materials that are highly conductive and lightweight.

Across industries ranging from batteries to military aerospace, the most valuable materials often combine high strength, low weight and strong electrical conductivity. MXenes are an emerging class of advanced materials whose tunable properties could improve electromagnetic shielding in electronics and help stealth aircraft reduce radar and infrared signatures. As detailed throughout this report, more than 18,000 research papers and over 10,000 MXene-related patent applications are demonstrating the breadth of potential applications and new pathways to commercialisation.

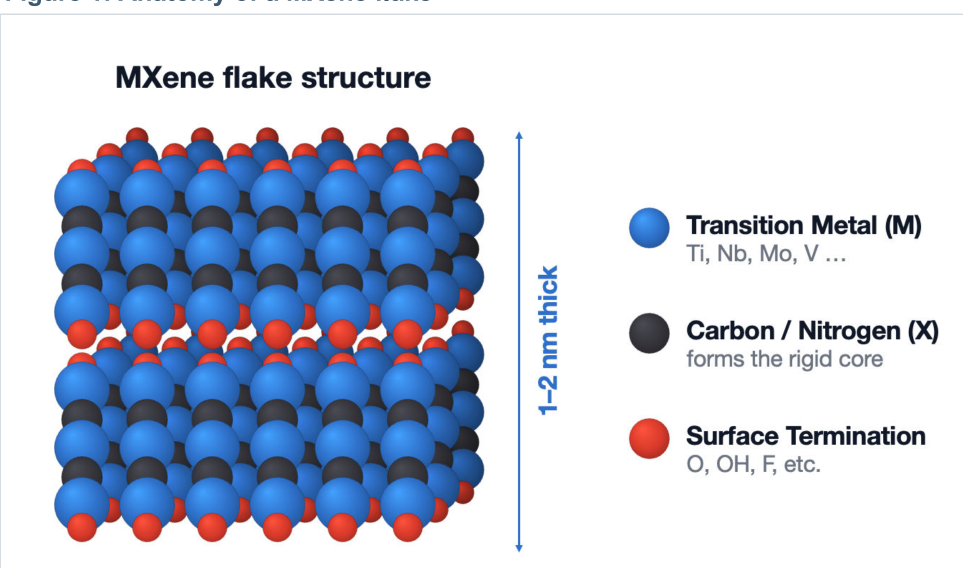
First discovered at Drexel University in 2011, MXenes remain at an early stage of research and development. However, their discovery has opened a new field of materials science focused on engineering atomic structures and surface chemistry to meet specific requirements across electrical conductivity, electromagnetic interference shielding and mechanical performance.

Ultra-thin only atoms thick that can be used as spray coatings on the surface of other materials.

The core to understanding MXenes is that they are a family of ultra-thin, two-dimensional materials made from transition metals such as titanium bonded with carbon or nitrogen, as shown in Figure 1. Each sheet can be only a few atoms thick, around one nanometre, or one billionth of a metre.

Despite being extremely thin, MXenes can offer a combination of strength, flexibility, low weight and electrical conductivity. This combination makes them potentially valuable across several high-growth markets, including energy storage, electronics, electromagnetic shielding and aerospace. The investment case for why MXenes are becoming increasingly valuable begins with one of their most important properties, tunability.

Figure 1: Anatomy of a MXene flake



Source: Research Gate.

Why MXene Tunability Matters

MXenes can be fine-tuned for specific electrical properties.

What makes MXenes particularly distinctive is their “tunability”. By altering the metal composition, atomic structure and surface chemistry, manufacturers like ECT can engineer MXenes with properties suited to the intended applications. In this case, ECT is targeting Defence-funded applications, where specialised MXene coatings can be fine-tuned for conductivity, EMI shielding, weight, flexibility and chemical stability across defence electronics and military assets.

The coating problem that could make MXenes very valuable

When comparing different materials, most conventional options offer a relatively fixed set of properties, forcing engineers to design products around their limitations. Copper, graphene and graphite are known for strong electrical conductivity but can lose some of these valuable properties when processed into coatings. In defence, radar-absorbing coatings represent a high-growth and potentially premium materials market because they help fighter jets and other aerospace platforms stay ‘under the radar.’

Why copper and graphene lose their edge in coatings?

Copper, graphene and graphite lose conductivity when converted into coatings.

Research on graphene shows that, although graphene itself is extremely conductive, its effective conductivity can fall sharply when dispersed into polymer-based coatings. In some cases, conductivity drops by several orders of magnitude, directly reducing its EMI shielding effectiveness. (Pavlou et al., 2021)[1].

Copper faces similar challenges too. While also highly conductive in bulk form, copper is dense, which is a disadvantage in aerospace applications where strength-to-weight performance is critical, and it is also susceptible to oxidation meaning that it can degrade faster than other materials. (Kanzaki, Kawaguchi and Kawasaki, 2017)[2]. For defence and aerospace applications, this creates a significant materials challenge, coatings must deliver high conductivity and EMI shielding while remaining thin, lightweight, mechanically robust and suitable for complex surfaces. MXenes are in the early stages of demonstrating these advantages.

How the choice of metal shapes the MXene performance

Four variables within the MXene structure can be precisely tuned.

As shown in Figure 2, the MXene formula contains four primary chemical variables that can be adjusted, with two that we will be focusing on that have the greatest impact on performance. The first is the choice of transition metal, represented by the “M” in the MXene formula. Researchers have successfully produced both single and multi-metal MXenes using titanium, vanadium, niobium, molybdenum, tantalum, zirconium and hafnium.

[1] Papari, G., Andreone, A. and Galiotis, C. (2021) ‘Effective EMI shielding behaviour of thin graphene/PMMA.

[2] Kawasaki, H. (2017) ‘Fabrication of conductive copper films on flexible polymer substrates by low-temperature sintering of composite Cu ink in air’, ACS Applied Materials & Interfaces.

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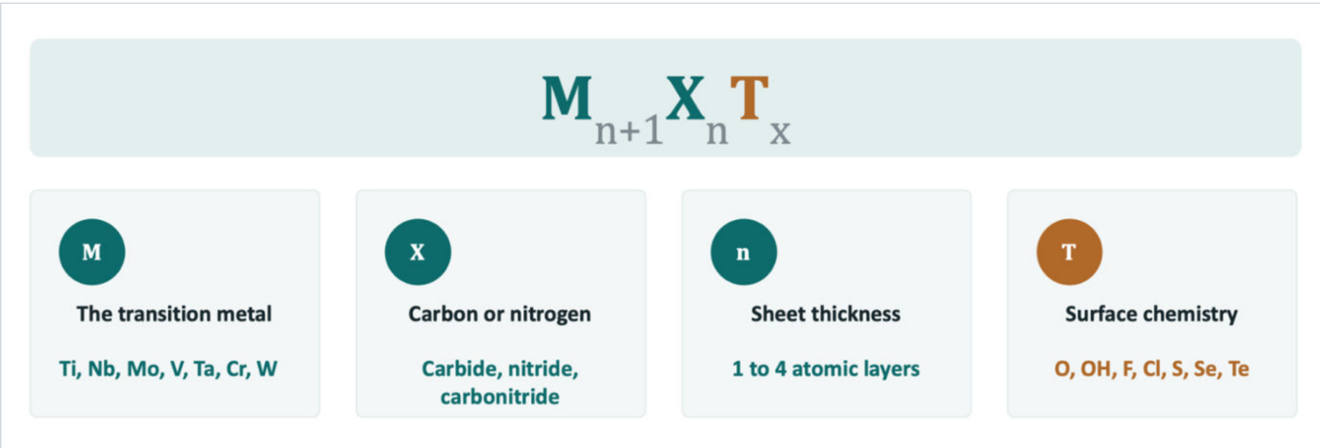
Figure 2: Breakdown of the MXene chemistry formula



Source: Pitt Street Research, Research Gate.

Why changing the metal changes the MXene opportunity

Changing the metal can alter the bonding and distribution of electrons within the MXene, allowing different compositions to provide different balances of electrical conductivity, chemical stability and electromagnetic response. Anasori et al. (2016), for example, demonstrated that replacing titanium with molybdenum in the outer metal layers could change how electricity moves through the material. The resulting MXene exhibited semiconductor-like behaviour, meaning its conductivity could be controlled more precisely[3].

Titanium MXenes raise the bar for defence EMI shielding

Titanium MXenes are emerging as a key focus for the DoD.

The combination of MXene transition metal tunability and solution-processable coatings is particularly relevant to defence because different applications require different electromagnetic properties. A MXene designed to shield defence avionics from EMI, for example, will not necessarily have the same electrical properties and structures as one engineered to absorb radar or suppress infrared signatures on aircraft and aerospace systems.

In the MXene market, titanium-based MXenes are among the most widely researched and commercially sought-after materials, historically accounting for more than 70% of MXene research (Lamiel et al., 2023)[4]. Their high metallic conductivity, layered structure and solution processability allow them to deliver strong EMI shielding at very low coating thicknesses, supporting their potential use in high-value defence applications and premium speciality-material pricing (Iqbal et al., 2024)[5]. The DoD is taking particular interest in titanium-based MXenes, where even a single change to the MXene metal layer can reshape how electricity moves through the material.

[3] Anasori, B., Shi, C., Moon, E.J., Xie, Y., Voigt, C.A., Kent, P.R.C., 2016), 'Control of electronic properties of 2D carbides (MXenes).
[4] Lamiel, C., Hussain, I., Warner, J.H. and Zhang, K. (2023) 'Beyond Ti-based MXenes: A review of emerging non-Ti based metal-MXene structure.
[5] Iqbal et al (2024) 'MXenes for multispectral electromagnetic shielding.'

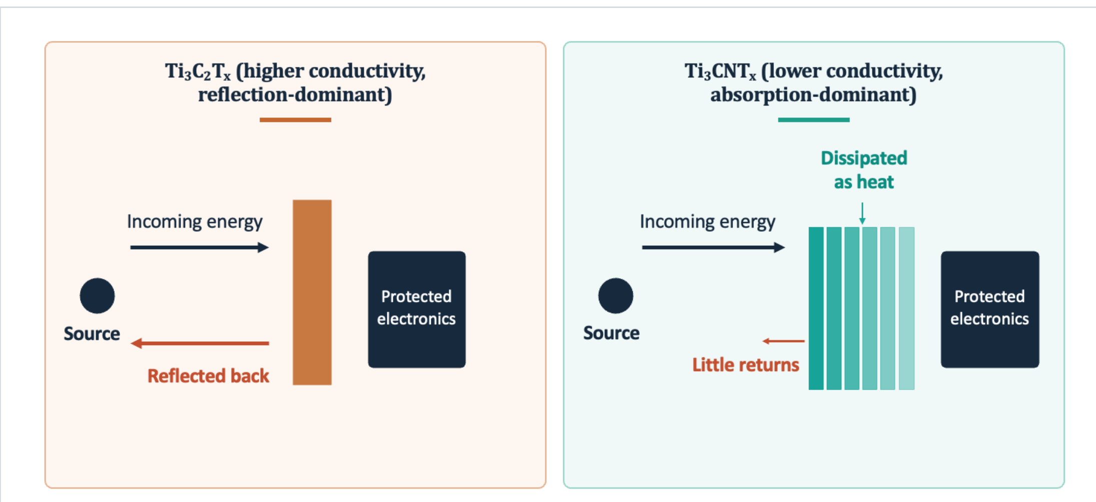
Fine-tuning MXenes at the atomic level

Changing the carbon-to-nitrogen ratio can alter EMI shielding performance.

The second variable is the "X", which represents the carbon, nitrogen or combined carbon–nitrogen atoms within the MXene structure, shown as the black atoms in (Figure 1). These atoms sit between the transition-metal layers and form part of the material's stable framework[6]. The choice of X determines whether a MXene is classified as a carbide, nitride or carbonitride. Carbide MXenes contain carbon, nitrides contain nitrogen, while carbonitrides contain both.

Changing this carbon and nitrogen composition can alter the material's flake-like structure and how radiation and energy are reflected or absorbed, as displayed in Figure 3. Alongside the other tunable variables within the MXene structure, this relationship can influence an absorption-dominant mechanism, where incoming electromagnetic energy is dissipated within the MXene structure rather than reflected from its surface, as is common with copper. The X layer can therefore play an important role in radar absorption and thermal-signature management, helping aerospace platforms such as Lockheed Martin fighter jets become harder to detect and improving stealth capability.

Figure 3: How MXene composition shifts the shielding mechanism



Source: Pitt Street Research.

MXenes don't just block EMI, they can absorb it too

This tunability could enhance stealth and reduce defence-platform detectability.

Research from Hantanasirisakul et al. (2019) supports this thesis[7]. The researchers found that a titanium-based MXene containing both carbon and nitrogen, Ti_3CNT_x, displayed lower electrical conductivity than the carbon-only $Ti_3C_2T_x$. Despite the same thickness, Ti_3CNT_x achieved stronger EMI shielding, attributed to its absorption-dominant mechanism. This shows that conductivity alone does not determine shielding effectiveness; how a MXene absorbs and dissipates electromagnetic radiation is also critical, helping explain why these specialised MXenes can command premium pricing.

[6] Hong, W., Wyatt, B.C., Nemani, K.K, B. (2020) 'Double transition-metal MXenes: Atomistic design of two-dimensional carbides and nitrides.
[7] Hantanasirisakul et al. (2019) Effects of synthesis and processing on optoelectronic properties of titanium carbonitride MXene.

Global MXene market size

MXenes are a US$50–75 million market growing at ~36% annually.

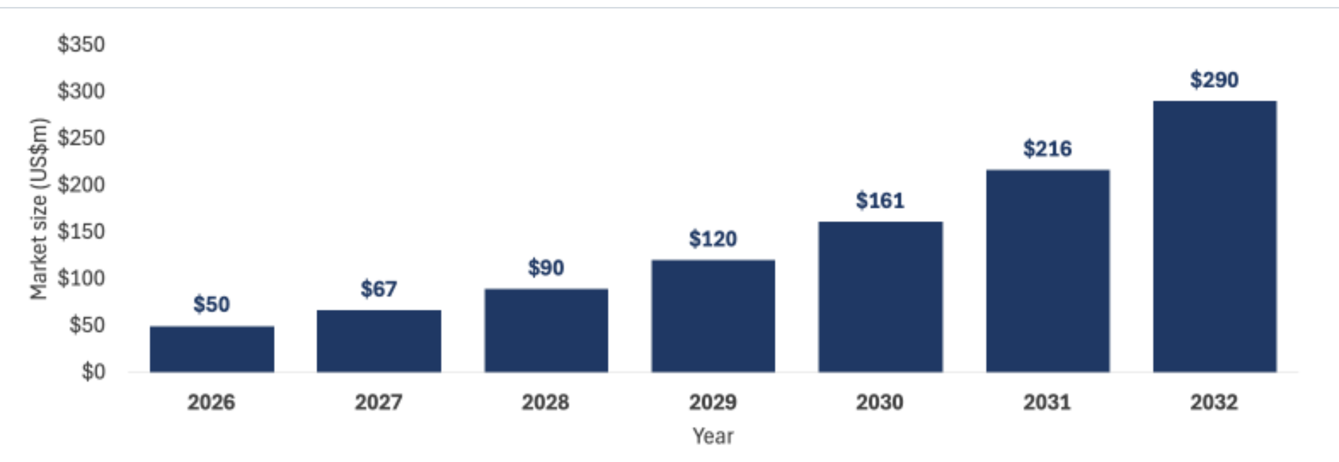
The global MXene market is currently small but growing rapidly, largely because the technology is still transitioning from laboratory research to early commercial-scale production. The most defensible estimates place the MXene materials market at approximately US$50–75 million in 2025–2026. MarketsandMarkets forecasts the market will grow from US$50 million in 2026 to US$290 million by 2032, representing a compound annual growth rate of 36% (Figure 4)[8].

Importantly, investors should not interpret the market's current size as evidence of limited demand. Instead, it largely reflects supply constraints associated with the existing MAX-phase production process. As discussed throughout this report, converting MAX-phase materials into MXenes requires slow and complex etching, purification and delamination processes that are typically completed in small batches measured in grams rather than kilograms[9]. This has kept production costs high and supply inconsistent, limiting current adoption only to high-value, low-volume applications.

Market forecasts expect MXene production to scale post-2027.

For the market to expand from US$50 million to US$290 million by 2032, forecasts largely assume that commercial-scale production begins to increase after 2028. Greater supply production methods and more competitive pricing would allow customers to adopt MXenes across a broader range of end markets. This is why ECT's collaboration with Metallium is strategically important. The partnership is exploring whether Flash Joule Heating can provide an alternative production pathway that improves the speed, scalability and economics of MXene manufacturing. If successful, it could create a new route to commercial-scale production and address one of the largest barriers currently limiting broader market adoption.

Figure 4: Global MXene Market, 2026–2032 (US$m) 36.0% CAGR



Source: marketsandmarkets.

[8] MarketsandMarkets (2026) MXene market size, share & trends by type, production method, form, end user, and region.
[9] Shahin, S.M.T. & Montazer, M. (2025) 'A comprehensive review on synthesis and application of MAX/MXenes as 2D nanoreactants.

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Why the defence market could unlock premium MXene demand

Defence is emerging as one of the strongest growth drivers for MXene demand.

One of the highest-growth markets supporting MXene demand and potentially premium pricing is the defence sector, which is a key reason we view ECT's MXene arm as a speciality materials business. ECT's engineering and technical team can therefore focus on high-value defence applications that command stronger pricing and margins.

We believe the most attractive opportunities are EMI shielding for defence electronics and advanced MXene coatings for aerospace, radar and signature reduction. Importantly, the US Department of Defence is already funding MXene-based coatings, shielding and composite systems for EMI shielding and stealth camouflage, providing early validation that these applications are moving beyond laboratory experiments and into defence development and procurement cycles.

US army funding puts MXenes on the defence map

Phase II contracts worth up to US$2 million are already funding companies to develop MXenes for defence.

As shown in Figure 5, the DoD is funding companies to turn MXene research into practical defence products through SBIR/STTR programs, which support small businesses developing technologies that can ultimately be tested, manufactured and adopted by the military. This is the commercialisation pathway ECT is targeting[10].

The US Army, for example, awarded Directed Vapor Technologies International (DVTI) ~US$2 million under a Phase II contract to develop lightweight MXene-impregnated textiles that protect equipment from hostile electromagnetic effects and shield communications, radar and electronic-warfare systems. The material was tested during Army field exercises, demonstrating its ability to disrupt or block radar data, communications and EW signals. The program is now progressing toward pilot-scale manufacturing, showing how DoD-funded MXene technologies can move from research into deployable defence applications.

Figure 5: US Department of Defence MXene Programmes

DoD programme	Contractor	Funding	MXene application
Deployable Passive EMS & EW Shielding	Directed Vapor Technologies International	US$1.93m Phase II	MXene-impregnated textiles for EW/EMS shielding and camouflage
MXene-Based Coatings for Aerospace Structures	Ballydel Technologies + Drexel	US$150k Phase I	Scalable MXene EMI coatings for aerospace structures
Scalable MXene Synthesis for Aerospace Applications	Ballydel + Drexel	US$1.25m Phase II	1 kg batch manufacture of MAX/MXene plus commercial-scale formulation/mixing
CERAMIC MXene coating	Physical Sciences Inc.	US$150k Phase I + ~US$2.0m Phase II	Conformal, absorption-dominant coating for electronics inside hypersonic vehicles
MXene high-voltage capacitor	SpinQI	US$75k Phase I	MXene/polymer composite capacitor

Source: US Department of Defence.

[10] Small Business Innovation Research (SBIR) (2024), Deployable Passive EMS & EW Shielding using bulk manufacturing processes.

The defence stealth opportunity

Through the research, what becomes increasingly prominent is the US military's clear focus on stealth technologies, particularly radar-absorbing coatings, as well as infrared and thermal-signature management. The core objective of modern stealth systems is to reduce the probability that a platform is detected by enemy sensors.

Three of five defence contracts target MXene-based camouflage and radar-absorbing coatings.

This is why research into MXenes' absorption-dominant mechanisms is particularly relevant. In Figure 5, three of the five contracts focus on absorption-based coatings for camouflage and defence technologies. The US military also describes the F-35's surface coatings as radar-absorbent and states that maintaining them is critical to preserving the aircraft's ability to evade radar and other defence systems (Figure 6). A similar approach is used on the F-22, where US Air Force documentation describes a radar-absorbing layer beneath protective topcoats. This highlights why the market represents a strong opportunity for ECT, providing a pathway for US-funded research to support deployable defence products.

Figure 6: US Department of Defence F-35A Lightning II

Source: US Airforce.

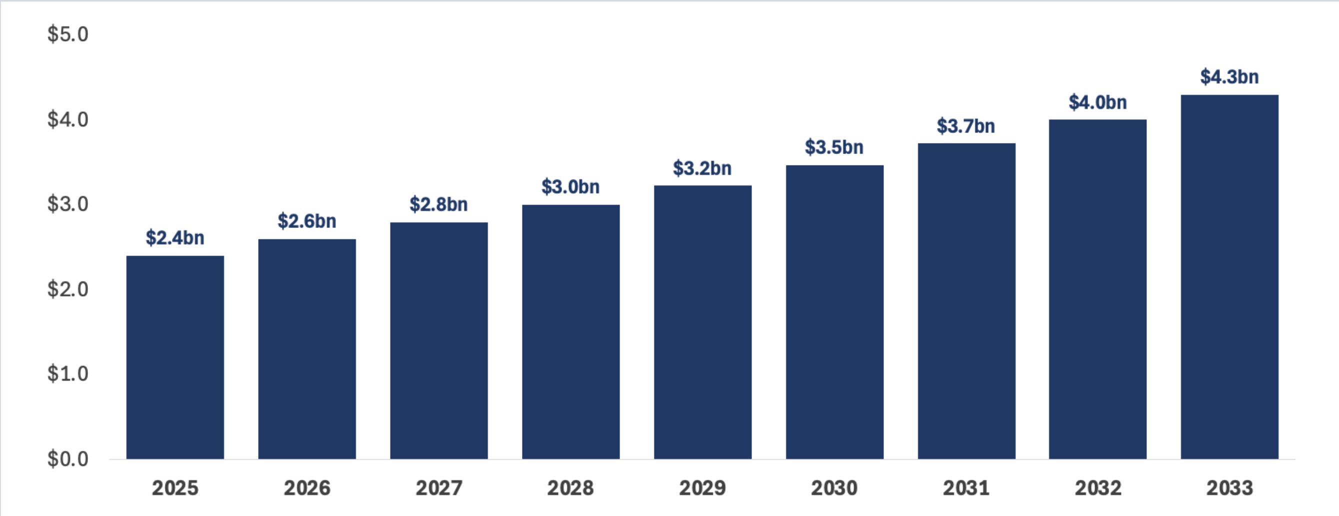
The global radar-absorbing materials market size

The global radar-absorbing materials market is already substantial, estimated at US$2.4 billion in 2025 and forecast to reach US$4.3 billion by 2033, representing a CAGR of approximately 7.6% (Figure 7). North America accounted for around 37.2% of the market in 2025, driven by growing adoption across stealth aircraft, missiles and naval platforms[11]. Within this market, radar-absorbing coatings alone are estimated at approximately US$52 million in 2025, rising to US$104 million by 2036, or around 6.5% CAGR.

Radar-absorbing materials represent a multi-billion-dollar global market.

[11] Grand View Research (2026) Radar absorbing materials market size, share & trends analysis report.

Figure 7: The radar-absorbing materials market size (US$ Billions)



Source: Grand View Research, 2026.

How ECT could turn MXenes into defence revenue

The DoD procurement cycle provides a clear revenue pathway for ECT.

For investors, defence procurement cycles provide a clear framework for understanding how ECT could ultimately generate revenue. To understand how this opportunity could develop, investors can look to the Missile Defence Agency's program with Physical Sciences Inc. Phase I is typically a 6–12-month feasibility study, the DoD typically sets clear technical requirements, such as developing an ultra-thin, flexible and high-temperature EMI shielding material that can be applied directly to internal electronics within hypersonic platforms.

Phase II then generally runs for around 24 months, representing a potential revenue milestone of approximately US$2 million, during which the technology is matured, prototyped, scaled and tested. Physical Sciences Inc.'s Phase II contract was awarded in September 2025, with development extending into 2027[12]. We believe this provides a useful example of the commercial pathway ECT could target: meet a defined defence specification, secure development funding, prove the material and progress toward larger-scale procurement and manufacturing. An important caveat is that these are our assumptions around how ECT could begin translating its MXene opportunity into revenue.

ECT builds MXene production around defence requirements

ECT has secured MXene precursor supply specifically targeting defence applications.

ECT has secured an initial 4 kg supply of MAX-phase precursor material to begin optimising and scaling MXene production. Importantly, suppliers and specifications have been selected with military applications in mind, meaning the feedstock is being tailored to defence performance requirements. This targeted approach could prove advantageous when pursuing initial Phase I-type defence contracts. ECT is also progressing additional supplier relationships to diversify and expand supply[13].

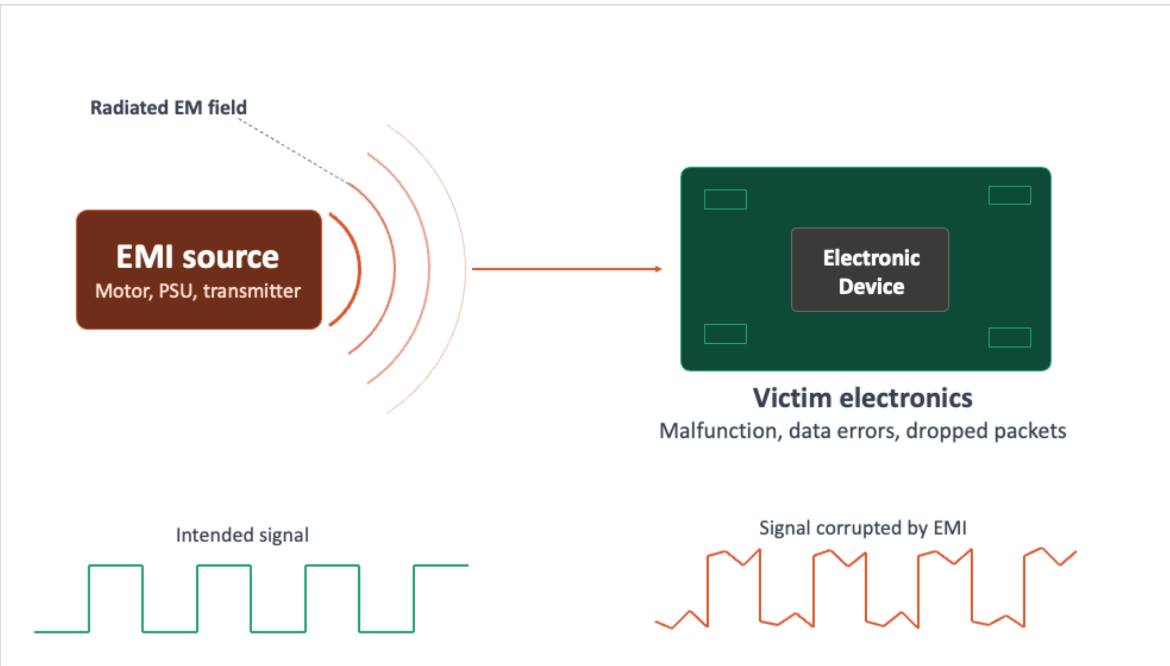
[12] Small Business Innovation Research (SBIR) (2024) Conformal Electromagnetic Radiation Absorptive MXene-Integrated Composite (CERAMIC).
[13] Environmental Clean Technologies Limited (2026) ECT secures initial MAX phase feedstock, commencing MXene scale-up programme.

The EMI shielding market

Another high-growth subsector that presents a compelling near-term and broader long-term opportunity for MXenes is electromagnetic interference shielding, commonly known as EMI shielding. Electromagnetic interference occurs when stray electromagnetic energy disrupts the normal operation of an electronic device, as illustrated in Figure 8. These signals can come from nearby electronics, motors, power supplies, power lines or radio transmitters, creating a clear commercial need for effective shielding materials. While particularly important in defence, EMI shielding also has applications across a range of broader commercial markets.

EMI shielding prevents electromagnetic radiation from disrupting electronic functionality.

Figure 8: How EMI reaches and corrupts electronics



Source: Pitt Street Research.

MXenes can block 99.999% of electromagnetic radiation

EMI shielding performance is measured in decibels, indicating how effectively a material reduces electromagnetic radiation and protects sensitive electronic systems. In a defining study, Shahzad et al. demonstrated that a 45 µm-thick $Ti_3C_2T_x$ MXene film achieved shielding effectiveness of 92 dB, blocking more than 99.999% of electromagnetic radiation[14].

$Ti_3C_2T_x$ MXene films achieved 92 dB shielding, blocking over 99.999% of electromagnetic radiation

What is particularly significant is that subsequent research continues to show how engineers can fine-tune MXene compositions to further improve their shielding performance. This growing body of evidence is beginning to establish the material's commercial potential in high-value applications such as EMI shielding.

[14] Shahzad, F., Alhabeb, M., Hatter, C.B.(2016) 'Electromagnetic interference shielding with 2D transition metal carbides

EMI shielding is a regulatory requirement

EMI shielding is a regulatory requirement.

The EMI shielding market also benefits from regulatory support. For electronics manufacturers, EMI shielding is often a compliance requirement rather than an optional upgrade. In the United States, FCC Part 15 regulates radio-frequency devices and requires manufacturers to limit electromagnetic emissions before products can be sold[15]. In US defence, MIL-STD-461H sets electromagnetic compatibility requirements for military electronics and subsystems, and, as highlighted by the military contracts discussed earlier, EMI shielding is a recurring requirement. Similar obligations apply in Europe under the EMC Directive 2014/30/EU, which requires applicable electronic equipment to control emissions and withstand interference before receiving CE marking[16].

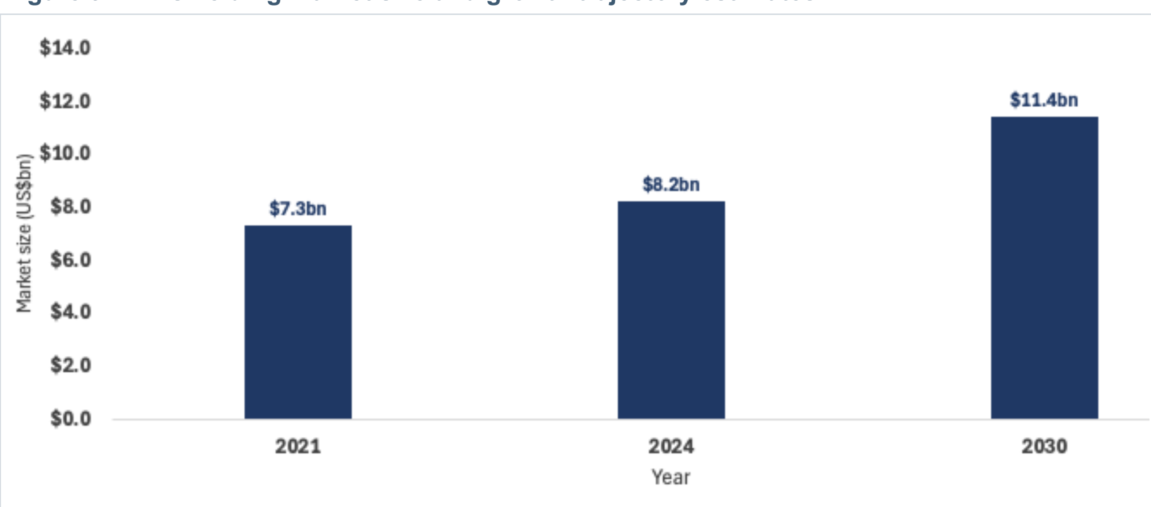
These regulations do not mandate the use of MXenes, but they create a structural need for effective shielding materials and coatings. That need is becoming more important as semiconductors and electronic systems become smaller, denser and more powerful, increasing the risk of internal interference. This broadens the potential role for MXenes beyond aerospace and defence into high-performance electronics, telecommunications, automotive systems and advanced semiconductor packaging.

EMI Shielding is already a multi-billion-dollar market

The EMI shielding market is projected to reach US$11.4 billion by 2030.

The global EMI shielding market is already a substantial advanced-materials market. Six independent research firms estimate its size within a relatively narrow range, providing a credible basis for market sizing. Current estimates place the market at approximately US$8.3 billion in 2024, increasing to US$11.4 billion by 2030 at a compound annual growth rate of 5.4%, as shown in Figure 9[17].

Figure 9: EMI shielding market size and growth trajectory estimates



Source: Grand View Research, 2025.

[15] Electronic Code of Federal Regulations (eCFR) (2026) Title 47, Part 15, Subpart B
[16] European Commission (2019) Commission Implementing Decision (EU) 2019/1326 of 5 August 2019
[17] Grand View Research (2025) EMI Shielding Material Market Size, Share & Trends Analysis Report

MXenes have a clear path into EMI coatings

EMI shielding coatings account for 33% of the total market.

While the broader EMI shielding market is not exceptionally high growth, its appeal lies in its established size, regulatory support and faster expansion across specialised applications such as electric vehicles, 5G and the Internet of Things. Growth across these end-markets should help pull demand for conductive coatings and advanced EMI shielding materials. Figure 10 illustrates where MXenes could fit within this market structure and the segments offering the strongest commercial potential for MXenes outside of just defence[18].

Automotive is expected to be one of the fastest-growing segments, expanding at approximately 6% annually as modern vehicles incorporate more electronic systems, including battery-management systems, electric motors, cameras, sensors and advanced driver-assistance technologies. Each additional electronic component increases the risk of interference and strengthens the need for effective shielding. An even faster-growing opportunity is conductive and EMI-shielding plastics used in 5G and IoT applications. This market was valued at approximately US$1.4 billion in 2024 and is forecast to reach US$2.52 billion by 2030, representing annual growth of around 11%.

EVs and IoT are accelerating demand for conductive materials.

Conductive coatings and paints already account for approximately 33% of the global EMI shielding market. This provides an established commercial pathway for MXenes. The opportunity is therefore not to create an entirely new market, but to penetrate an existing and growing segment with a material that may offer superior performance in weight-sensitive and geometrically complex applications.

Figure 10: MXene applications in EMI shielding (market structure)

Segment	Current position	Growth outlook	MXene relevance
Conductive coatings and paints	32.7% of the 2024 market	Largest material category	Very high
Consumer electronics	31.5% of 2024 end-use revenue	Largest end-use market	High
Automotive	Fastest-growing major end use	6.2% CAGR	Very high
Conductive shielding plastics for 5G and IoT	US$1.4bn in 2024	~11% CAGR	Very high
Conductive polymers in 5G and IoT shielding	US$785.6m in 2024	11.4% CAGR	High
Asia-Pacific	41.4% of 2024 revenue	Largest and fastest-growing region	Strategically important

Source: (Grand View Research, 2025).

[18] Grand View Research (2025) EMI Shielding Material Market Size, Share & Trends Analysis Report by Product, Region and Segment Forecasts, 2025–2030.

The global MXene pricing landscape

Global pricing is driven more by production constraints than demand.

MXene pricing remains highly fragmented, reflecting an industry still transitioning from laboratory-scale production toward commercial supply. Two factors largely explain why MXene prices per gram remain so high. The first is constrained supply. Conventional MAX-phase etching, the standard production method today, can produce low and variable yields, with further material losses during delamination, making consistent and economical scale-up difficult. The second is the structure of demand. Buyers are still predominantly research institutions and specialist end-users purchasing small volumes, rather than large commercial markets capable of driving scale and lowering unit costs. This limited production scale keeps costs high and continues to constrain broader commercial adoption[19].

Graphene went through a similar commercialisation cycle.

This dynamic is not unique to MXenes. Graphene followed a similar path during its early commercialisation, with high per-gram pricing declining as production capacity expanded and manufacturing processes matured. MXenes appear to be at an earlier point on the same curve. For now, limited production scale and low-volume specialist demand keep manufacturing costs and prices elevated, leading many suppliers to rely on a "request a quote" model rather than transparent commodity-style pricing.

Small-scale production keeps MXene prices high

In many respects, this is a classic supply-demand imbalance. Interest in MXenes is growing, but commercial supply remains constrained as manufacturers work to identify scalable and cost-efficient production methods. Most suppliers still operate at small batch sizes, measured in grams rather than kilograms, keeping unit costs high and pricing transparency limited. Figure 11 compares current MXene production costs of around US$20–24 per gram with a study from Serafin et al. (2025) examining how costs could fall as low as US$3.27 if production reaches commercial scale.

MXene production costs currently average around US$22 per gram.

Put simply, MXene production has not yet reached the scale needed to benefit meaningfully from economies of scale. Zaed et al. (2024), writing in Open Ceramics, estimated $Ti_3C_2T_x$ MXene production costs at approximately US$20.33 per gram, illustrating how expensive production remains at current manufacturing scales[20].

Figure 11: MXene Current vs. Forecasted Production Cost Benchmarks

Source	MXene / form	Cost (US$/g)
Current production cost (lab / pilot scale)		
Zaed et al. (2024), Open Ceramics	$Ti_3C_2T_x$	$20.33
Ali et al. (2025)	V_2C MXene	$24.11
Current cost, average		**$22.22**
Forecasted production cost at scale		
Serafin et al. (2025), Chemical Engineering Journal	$Ti_3C_2T_x$	$3.27
Cost reduction, %		**85.3%**

Source: Serafin et al. (2025), (Zaed et al., 2024), Ali et al. (2025).

[19] Wang, L. & Huang, Y. (2019) 'Boosting the yield of MXene 2D sheets via a facile hydrothermal-assisted intercalation', ACS Applied Materials & Interfaces
[20] Zaed, M.A., Tan, K.H. (2024) 'Cost analysis of MXene for low-cost production, and pinpointing of its economic footprint

Why premium MXenes command higher prices

The second factor is that not all MXenes are created equal. Unlike copper or graphite, MXenes behave more like speciality nanomaterials, where pricing depends on composition, purity, flake size, layer structure, surface terminations and processing requirements. This means value is not determined by supply and demand alone. Material performance and consistency can command significant premiums, as currently seen with titanium-based MXenes. As the market evolves, we expect pricing to split between premium and more commoditised segments depending on formulation and specification.

MXene pricing also varies by formulation, with some commanding significant premiums.

MXene pricing is therefore best understood not as a single figure, but as a wide and opaque distribution. Across the range of surveyed suppliers in Figure 12, list prices for nominally the same material, titanium carbide ($Ti_3C_2T_x$), range from roughly US$44 per gram to several hundred dollars per gram, with a median near US$400/g. Fully characterised research-grade powder can sell for hundreds of dollars per gram, while unbranded bulk industrial material trades at significantly lower prices, supporting our thesis that the MXene market is likely to develop into distinct premium and commoditised segments[21].

Roughly US$44 to US$2,340 per gram, median US$400.

Figure 12: MXene Retail / Selling Price Benchmarks

Source	MXene / form	Particle size	Purity	Price (US$/g)
Nanografi (Nanografi n.d.)	$Ti_3C_2T_x$ powder	2–20 µm	98+% (phase)	$43.93
XFNANO (XFNANO n.d.)	$Ti_3C_2T_x$ few-layer	*n/a*	n/a	$78.57
Nanographenex (Nanographenex n.d.)	$Ti_3C_2T_x$	*2–20 µm*	98+%	$319.00
Cheap Tubes (Cheap Tubes n.d.)	$Ti_3C_2T_x$	*n/a*	>99%	$400.00
Sigma-Aldrich (Merck n.d.)	$Ti_3C_2T_x$	*10–30 µm*	99.9%	$488.00
ACS Materials (ACS Material n.d.)	$Ti_3C_2T_x$ multilayer	*0.1–0.2 µm*	*54–68 wt%*	$492.00
Sigma-Aldrich (Merck n.d.)	$Ti_3C_2T_x$ few-layer, 500 mg	n/a	n/a	$1,306.00
AMC Material	$Ti_3C_2T_x$	n/a	n/a	$2,340.00
ECT (Environmental Clean Technologies 2026)	High-quality US $Ti_3C_2T_x$ powder	*n/a*	*n/a*	$100.00
Median supplier list price (US$/g)			**$400.00**	
Mean supplier list price (US$/g)			**$618.61**	
Spread, low to high (x)			**53.3x**	

Source: (XFNANO), (Nanografi, 2026), (Cheap Tubes), (Zaed et al., 2024), (AMC Material).

[21] All sources for pricing referenced in figure 12.

The race to reinvent MXene production

Conventional MXene production methods are not scalable or cost efficient.

MXene production pathways are making progress, and ECT is at the frontline in this area, but the industry is still in its very early stages. New publications are demonstrating how quickly the manufacturing landscape continues to evolve. Rather than simply refining conventional MAX-phase etching, which remains the most common production method today, researchers are testing new methods designed to reduce costs, improve purity and make MXene manufacturing easier to scale, including Flash Joule Heating, which is central to ECT's new production strategy.

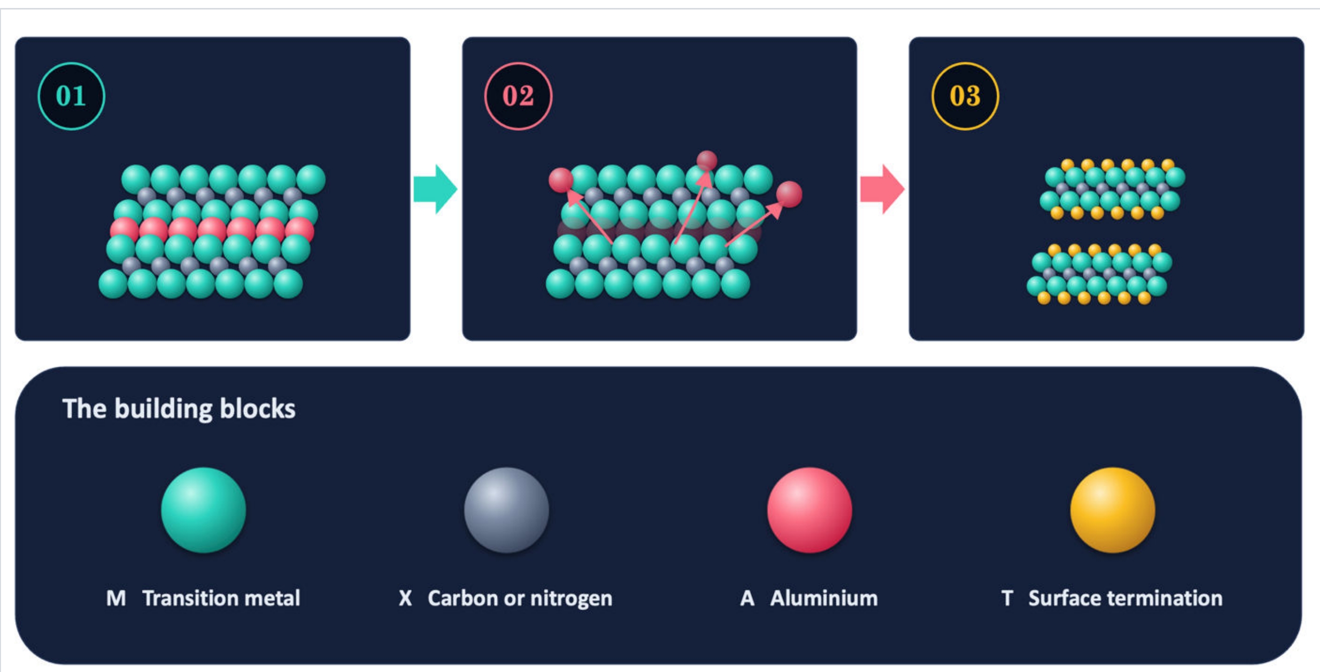
What is conventional MAX-phase selective etching

Hazardous chemical volumes and slow processing limit scalability.

In the current market, the most common MXene production method, known as MAX-phase etching, is a slow and hazardous process that typically produces only small batches of MXenes in grams. It is not considered an ideal pathway for large-scale production, largely because of the significant volumes of acid required during processing.

This etching process typically begins with a layered MAX-phase material, represented by Stage 1 in Figure 13, which can be viewed as the precursor material and commonly contains aluminium between layers of transition metals and carbon or nitrogen. Chemical etching, often using hydrofluoric acid or other fluoride-based acids, is then used to remove the aluminium layers in Stage 2. Once the aluminium is etched away, the remaining atomic layers form the thin, two-dimensional structure known as MXene, represented by Stage 3.

Figure 13: Conventional MAX-phase production process in three stages



Source: Pitt Street Research, Research gate.

Flash joule heating for scalable MXene production

Flash Joule Heating (FJH) represents a new more cost efficient and faster approach to MXene production. A recent Nature Synthesis paper, supported by supplementary work from Professor James Tour's group at Rice University, who founded the FJH technology provides early evidence that the FJH process can work at laboratory scale. The study reported MXene purity above 90%, yields of approximately 56–72% and an estimated total production cost around 74% lower than conventional MAX-phase chemical etching.

FJH achieves >90% purity and cuts production costs by up to 74% at lab scale.

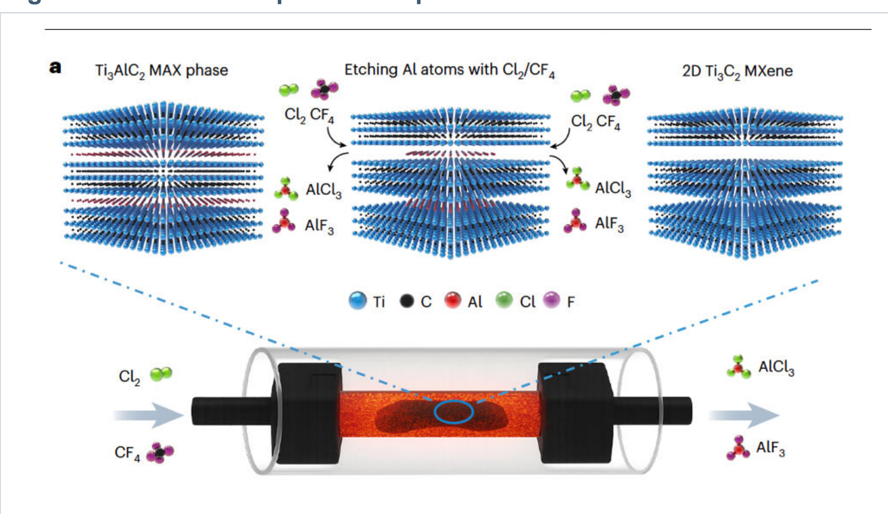
A faster route to removing aluminium with FJH

FJH takes a fundamentally different approach to MAX-phase etching. Instead of relying on liquid acids, it uses gas, which has fundamentally faster reaction kinetics. The FJH process starts by placing the precursor MAX-phase powder on conductive carbon paper inside a quartz tube and rapidly heated using an electrical pulse. Temperatures can reach approximately 1,560°C almost instantly, allowing the aluminium to be removed using reactive gases rather than prolonged chemical etching (Figure 14).

FJH replaces liquid chemical etchants with reactive gases.

The process begins with chlorine gas, which rapidly reacts with aluminium to form aluminium chloride. Chlorine removes most of the aluminium within seconds, but prolonged exposure can begin attacking the titanium that must remain in the MXene structure. After roughly 10 seconds, the gas is switched to CF_4. which reacts more selectively with aluminium, removing the remainder with less damage to the titanium layers. Put simply, chlorine provides the speed, while fluorine provides the precision[22]. This two-stage process reduces aluminium removal from many hours to roughly 30 seconds, highlighting why FJH could offer a faster, cleaner and lower-cost pathway to MXene production if scaled reliably. Importantly, the scaled process is not expected to require CF_4.

Figure 14: FJH MXene production process



Source: Xu et al. (2026).

[22] Tour, J.M. (2026) 'Flash Joule heating for rapid MXenes synthesis', Nature Synthesis.

Why is the FJH process cheaper?

FJH can produce MXene batches in seconds rather than hours.

The core advantage of FJH almost always comes back to the clock. Energy and operating costs increase with production time, therefore as conventional chemical etching can require around 24 hours of electricity, labour and process monitoring. By comparison, FJH has been reported to consume 94% less energy than HF etching and 92% less than molten-salt processing, while reducing total costs by approximately 80% and 74%, respectively. Most of the remaining cost from the FJH process comes from the gases rather than electricity.

The second major advantage is waste. HF etching can generate kilograms of hazardous liquid waste for every 100 grams of MXene produced, adding treatment, handling and disposal costs[23]. This highlights why conventional chemical etching becomes increasingly difficult to justify as a long-term, scalable production pathway.

[23] Xu, S., Yang, K., Zhu, H. et al. (2026) 'Flash Joule heating for rapid MXenes synthesis', Nature Synthesis. In Supplementary Table 13.

ECT leverages Metallium to scale-up FJH

The 12-month agreement can be extended if commercial progress continues.

One of the core investment opportunities underpinning ECT's MXene thesis lies in its strategic agreement with Metallium (ASX:MTM) to scale this FJH production method using Metallium's small modular reactors. Having established the potential advantages of MXene properties, growth sectors and pricing dynamics, investors may now be asking how ECT intends to scale production given the limitations of conventional methods and how much capital will be required.

Firstly, the partnership provides ECT with far more than access to a reactor. It combines ECT's proposed exclusive intellectual property rights to produce MXenes with an established engineering team and operating facility at MTM's Gator Point site. This gives ECT access to existing infrastructure and technical capabilities, avoiding the need to build an independent production platform from the ground up, a process that could otherwise require years of development and millions of dollars in capital[24].

How the commercial agreement works

The investment opportunity is that this could save ECT from raising additional capital to build its own production fleet.

Under the 12-month collaboration, ECT will use Metallium's reactors and laboratory space at the Gator Point Technology Campus in Texas to produce MXenes and advance its research programme. ECT will retain ownership of the material produced, while Metallium generates early revenue through its "processing-as-a-service" model. We view this as a capital-efficient pathway for ECT to refine production without significant upfront investment. If successful, the companies may negotiate a longer-term licence or royalty agreement.

The partnership is also supported by their shared technology lineage. Both are commercialising Flash Joule Heating technology licensed from Rice University, while ECT CTO Justin Sharp previously worked in Professor James Tour's research group and assisted with the early scale-up of Metallium's modular reactors. His familiarity with MTM's technology and engineering team should help reduce technical friction and accelerate development.

ECT aims for capital efficiency without shareholder dilution

ECT is looking to use MXene sales to generate cash that can be reinvested into its longer-term PFAS opportunity.

From a shareholder perspective, the most immediate benefit is capital efficiency. ECT is seeking to establish a pathway to generate potential MXene revenue that could help fund development of its longer-term PFAS destruction platform, without first having to finance and build its own fleet of modular FJH reactors.

Building and commissioning that infrastructure would likely require a multi-million-dollar investment and lengthy development timeline. For a pre-revenue company approaching its pivotal PFAS pilot in H2 CY2026, avoiding this expenditure preserves cash and extends its funding runway. The collaboration converts a large upfront capital commitment into an operating arrangement, allowing ECT to advance both programmes without immediately returning to equity markets following its recent raise. This also reduces the near-term dilution risk for existing shareholders.

[24] Metallium Limited (2026) Metallium Signs First Technology Services Agreement Advancing Processing-as-a-Service Strategy.

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Metallium provides ECT with a technical head start

The second benefit is technical de-risking. Metallium has already completed multi-unit FJH campaigns at its Texas facility, including a 12-hour continuous run across three reactors in June 2026 that achieved average unit availability of 83%. As shown in Figure 15, ECT will therefore be working with small modular reactors that have already undergone meaningful operational testing, giving ECT access to Metallium's early-stage scale-up expertise rather than having to develop that technical capability and assume the associated risk independently[25].

MTM's early scale-up progress is helping validate a pathway to commercial MXene production.

Why Metallium's scale-up matters for MXene commercialisation

Metallium is now progressing to the next stage of scale-up, including reactor modifications, instrumentation upgrades and calibration before operating multiple units with commercial circuit board feedstocks. Its current platform is targeting an increase from approximately 1 tonne per day to 5 tonnes per day. While this work is not directly related to MXene production, successful scale-up within Metallium's own operations provides another important de-risking milestone for ECT by demonstrating that the modular reactor platform can operate reliably at higher throughput, strengthening the case that there is a credible pathway to scale MXene production.

Figure 15: Metallium's small modular reactor commissioning

Source: Metallium.

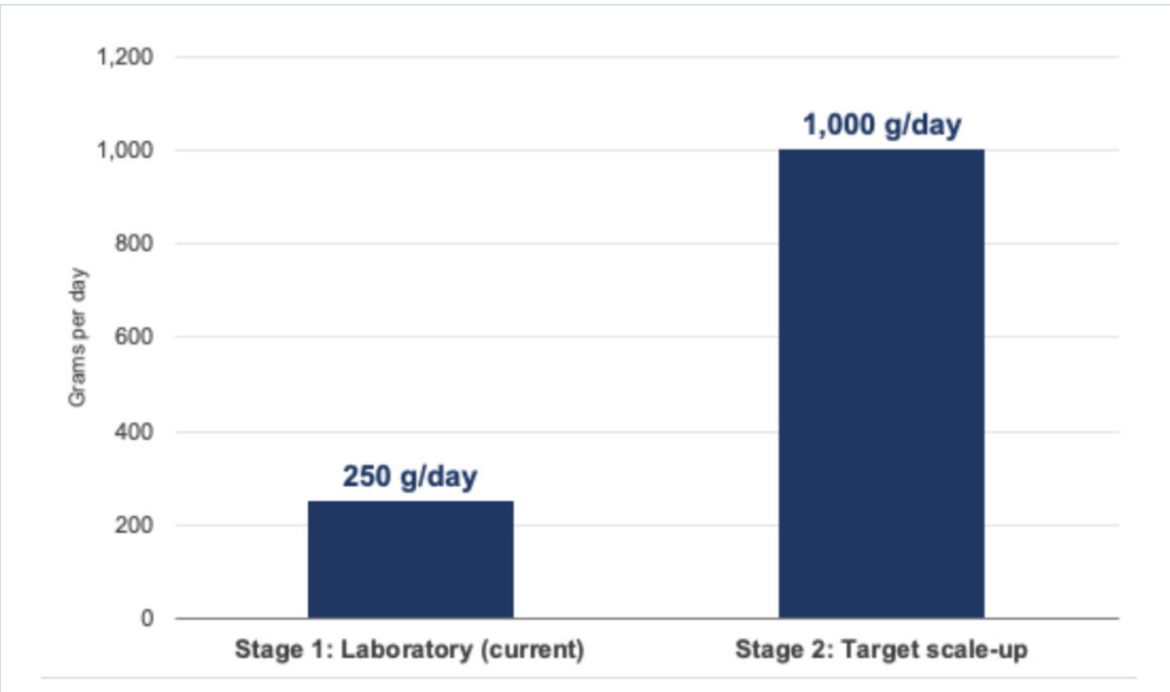
[25] Metallium Limited (2026) Successful Completion of First Multi-Unit Flash Joule Heating Operations Campaign. ASX Announcement, 16 June 2026.

How far has ECT Scaled MXene production?

ECT is aiming to produce 1kg of MXenes per day.

An encouraging early milestone has been the laboratory-scale feasibility production achieved under the partnership. ECT has produced approximately 250 grams of MXene per run across cycles lasting 30 to 90 minutes as part of initial testing, with a near-term target of scaling output to 1 kilogram per day (Figure 16). While purity was lower during these early feasibility runs and volumes remain below commercial scale, the results demonstrated that Metallium's reactor design is well suited to MXene production. Management has indicated that the scale-up programme is progressing well.

Figure 16: ECT MXene production scale goals



Source: ECT, company.

What could ECT's MXene unit economics look like?

ECT is targeting the start of MXene sales in Q1 2027.

The potential unit economics for MXenes are particularly interesting and align closely with ECT's capital strategy. The company is seeking to reduce its reliance on future capital raisings by generating near-term revenue from MXene sales. To achieve this, ECT will need to successfully scale production toward its 1 kg per day target while selling into premium markets where MXene pricing can range from approximately US$100–400 per gram or even higher.

ECT's MXene scale-up points to big revenue from small volumes

On the unit economics alone, producing 1 kg of MXene per day at a potential selling price of US$100–400 per gram would imply approximately US$100,000–US$400,000 in daily revenue capacity at 100% sell-through. Again, investors should recognise that this assumes both current pricing remains unchanged and ECT is able to sell its entire daily output, assumptions we do not believe are sustainable over the long term as production scales and supply increases. Even so, the calculation highlights the significant revenue potential MXenes can generate from relatively small production volumes at current market pricing (Figure 17). ECT is targeting initial small-batch MXene sales by Q1 2027, although this remains a company objective and the timeline could slip.

Producing 1 kg per day could generate US$100,000–US$400,000 in daily revenue.

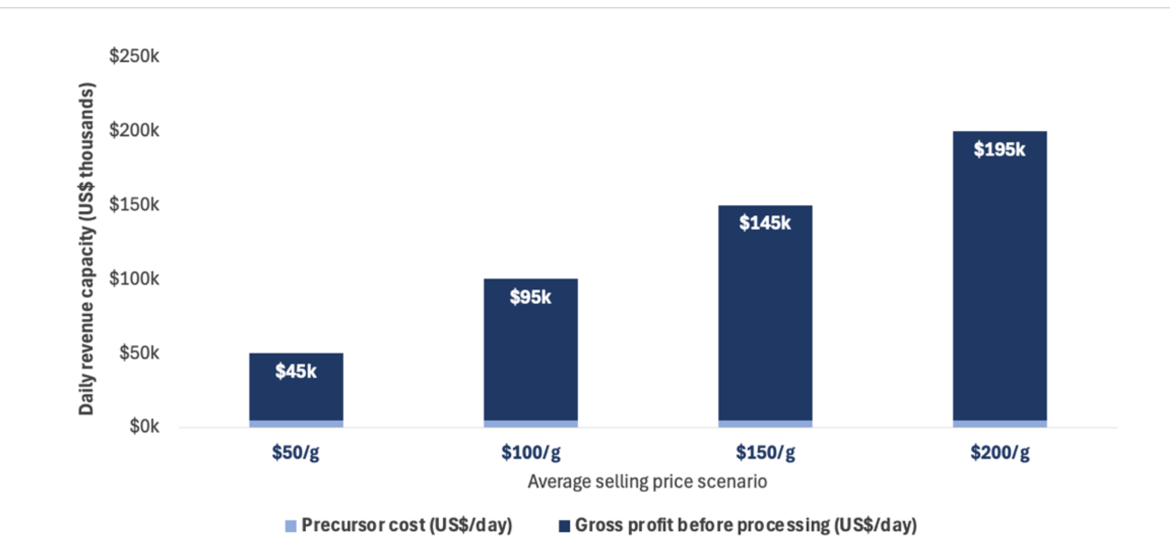
What is the potential cost base for MXenes

On the cost side, ECT recently reported that its initial 4 kg of precursor material was secured at approximately US$3,475 per kilogram, implying a total cost of US$13,900. This is expected to support around 15–40 production runs through the initial scale-up programme. Once optimised, management expects 4 kg of precursor could produce approximately 3 kg of finished MXene, implying a precursor-only input cost of around US$4.63 per gram versus potential selling prices in the hundreds of dollars per gram. This highlights the potential for attractive gross margins if ECT achieves commercial-scale yields and premium pricing.

Precursor costs imply just US$4.63 per gram of finished MXene before operating costs.

Importantly, this does not yet include processing costs such as energy, gases, labour, reactor charges, purification or yield losses beyond the assumed 75% conversion. Even so, the early unit economics appear attractive, particularly given ECT does not need to fund the construction of the reactors itself. We reiterate that these remain our assumptions rather than definitive commercial outcomes, but they provide an early indication of the potential economics as production scales.

Figure 17: MXene unit economics (assumptions) at 1 kg/day daily revenue capacity



Source: ECT, Pitt Street Research.

Our ECT sum-of-the-parts valuation

Our sum-of-the-parts valuation implies A$0.28–A$0.36 per share.

Our valuation of ECT is anchored on a sum-of-the-parts methodology, separating the existing PFAS business from the emerging MXene opportunity. We have developed a distinct comparable peer group for each business segment, allowing investors to assess where ECT is valued today and the potential re-rating opportunity as its PFAS destruction pathway advances toward commercialisation and the MXene business develops into a new potential revenue stream. Our updated sum-of-the-parts valuation Figure 22 implies a price range of A$0.28–A $0.36 per share, representing potential upside of approximately 141%–217% from the current share price**.**

Our PFAS valuation case remains unchanged

Our investment case for the PFAS business remains unchanged.

Our valuation of ECT's PFAS business remains unchanged at approximately A$95–120 million. The reason is that our investment thesis continues to centre on the next major re-rating catalyst: validation of the REM electrical pilot system on PFAS samples in H2 CY2026. This milestone would effectively demonstrate that ECT's electrical system can destroy PFAS under real-world operating conditions, potentially opening the door for an integrated device manufacturer to incorporate the technology into a commercial treatment system.

Assuming this is successful, we see ECT converging toward the PFAS remediation peer universe in Figure 18 in our base case, supporting an equity valuation of A$95 million, or A$0.21 per share based on the current 448.5 million shares outstanding. A strongly executed outcome, combined with EPA traction, would support a technology-precedent re-rate in line with Metallium's post-pilot pathway, underpinning our bull-case valuation of approximately A$120 million, or A$0.27 per share. For investors looking to better understand the PFAS opportunity and how this could impact ECT's potential re-rate. our recent PFAS update can be found here.

Figure 18: Comparable Companies Analysis PFAS Remediation Peer Universe

Company	Ticker	Value Chain Segment	Market Cap (AUD$m)
Environmental Clean Technologies	**ASX:ECT**	**Destruction, thermal (REM / FJH)**	**46**
Tier 1 — Succesful Pilot Program Development			
Aduro Clean Technologies	NASDAQ:ADUR	Early Stage Destruction	784
Metallium	ASX:MTM	N/A	332
Tier 1 — PFAS Remediation Across The Value Chain			
Arq Inc	NYSE:ARQ	Capture media, activated carbon	125
BioLargo	OTCQX:BLGO	Capture & concentration	48
The Environmental Group Limited	ASX:EGL	Capture & concentration, water treatment	36
374Water	NASDAQ:SCWO	Early Stage Destruction	48
Tier 1 Median			***87***
Tier 1 Mean			***229***

Source: Pitt Street Research estimates, Company financials.

[26] Peer group updated on the 13th of August 2026

MXenes lift our ECT valuation to A$0.28–A$0.36

The MXenes business supports a valuation uplift.

The valuation bridge supporting our updated A$0.28–A$0.36 per share range reflects the addition of ECT's speciality materials business targeting defence, aerospace and electronics applications, while also accounting for the higher share count following the company's recent capital raise. Our underlying PFAS equity valuation remains unchanged but now equates to approximately A$0.21–A$0.27 per share on the current share count. We currently value the speciality materials business at a range of A$29–A$43 million, or A$0.06–A$0.10 per share.

We applied a bottom-up revenue forecast and a comparable-company valuation using defence speciality-material peers on the ASX and in the US. The revenue model estimates what ECT could sell, while the peer multiple indicates what that revenue could be worth. Given its target markets, we believe ECT should be compared with companies commercialising high-performance materials into defence, aerospace and advanced electronics rather than broader commodity-material peers.

Our revenue build model assumptions

We have used a revenue build model for the potential sales of MXenes.

Our revenue model is built from the research and unit economics assumptions outlined throughout this report and reflects an initially conservative base case. The purpose of the model is to give investors an early indication of the potential revenue opportunity MXenes could represent for ECT. However, we want to make clear that these remain assumptions, and there is still limited visibility around the timing and scale of future commercial revenue. Investors can find our key revenue-build assumptions in Figure 19.

Figure 19: MXene Revenue Model Key Assumptions & Output

	Unit	CY2027	CY2028	CY2029
Operating assumptions				
Production capacity	kg/day	1	2	5
Operating days	days	250	250	250
Operational utilisation	%	40%	60%	75%
Qualified product yield	%	90%	92%	95%
Sell-through	%	15%	35%	45%
Average selling price	A$/g	A$155	A$69	A$21
Model output				
Qualified output	kg	90	276	891
Volume sold	kg	14	97	401
Revenue	A$m	**A$2.1**	**A$6.7**	**A$8.4**
Revenue growth	% YoY	n.a.	219%	26%
Implied revenue per kg sold	A$/kg	A$155,000	A$69,000	A$21,000

Source: Pitt Street Research estimates.

The operating capacity assumptions

We assume MXene production capacity begins at 1kg per day in CY2027 and scales to 5 kg per day by CY2029, based on 250 operating days per year. Based on discussions with management, we believe ECT could reach its 1 kg per day production target over the next 6–8 months, with capacity gradually increasing as additional modular FJH systems are modified, integrated and scaled.

Starting conservatively at 1kg per day, with capacity scaling over time.

ECT's MXene sales cycle and sell-through assumptions

We also assume an initial sell-through rate of 15%, representing the proportion of qualified MXene output ultimately sold. Importantly, ECT's production capacity and actual sales are two separate metrics. Our assumption is that FJH can successfully scale production, while the low initial sell-through primarily reflects uncertainty around customer qualification and defence procurement timing rather than softer demand.

Sell-through starts conservatively before scaling with commercial adoption.

As outlined in this report, ECT is initially targeting defence markets, where procurement, qualification and technical validation can take 1–3 years. As a result, we expect early MXene sales, particularly in 2027, to be weighted toward testing, prototyping and qualification before progressing to larger commercial orders over the long term. This is why we scale sell-through higher in later years, broadly reflecting the sales trajectory seen across advanced materials and manufacturing companies such as Titomic (ASX:TTT).

How the pricing dynamics are influenced by scale

Our broader market assumption is that, as MXene production technologies scale and more supply enters the market, pricing will naturally decline over time. We believe this is necessary for the market to develop, as prices need to become more accessible for a broader range of manufacturers and product developers to adopt MXenes at scale. As production capacity increases across both ECT and the wider industry, we therefore expect pricing to follow a typical supply-and-demand cycle and gradually normalise.

As MXene supply scales, pricing is expected to decline.

That said, we believe ECT could remain toward the upper end of the pricing range given its speciality materials strategy is focused on high-value defence applications, where performance requirements are more demanding and products can command greater pricing power. ECT is likely to stay within this premium pricing bucket.

Forecasting ECT's MXene Revenue Ramp

Therefore, based on our assumptions, we forecast approximately A$2.1 million of MXene revenue in CY2027. We believe this represents a defensible starting point given the limited volumes required to achieve this revenue, while still allowing for production ramp-up, customer qualification and longer defence sales cycles. Revenue then increases to approximately A$8.4 million by CY2029 as production utilisation improves, a greater proportion of qualified output is sold and commercial orders scale.

Potential for A$2 million in MXene revenue by 2027.

Our valuation bridge: defence multiples put ECT's MXenes in play

Using a comparable defence peer set across advanced materials and manufacturing, we apply a consensus FY2028 EV/revenue multiple. Our peer group is split into two tiers. The first includes ASX-listed additive manufacturing companies with defence exposure, including Titomic (ASX:TTT), Amaero (ASX:3DA), Metal Powder Works (ASX:MPW) and AML3D (ASX:AL3). The second includes US-listed advanced manufacturing and speciality-material companies with established aerospace and defence exposure, including Velo3D (NASDAQ:VELO) and Park Aerospace (NYSE:PKE). Investors can see our peer set in Figure 20.

Across this peer group, the median FY2028 EV/revenue multiple is 4.3x, with median TTM revenue of approximately A$8 million for the Australian peers and A$14 million across the full peer set. This provides a useful benchmark for the current commercial scale of speciality-material and advanced-manufacturing businesses exposed to defence markets. Applying the 4.3x multiple to our FY2028 revenue assumption of A$6.7 million implies a contribution of approximately A$29 million to our SOTP valuation. On a per-share basis, this supports a base-case valuation of approximately A$0.06 per share, highlighting the value ECT's speciality materials business could contribute as commercialisation progresses.

FY28 EV/Revenue multiple is 4.3x.

Figure 20: Defence & Speciality Materials Comparable Companies

Company	Ticker	What it does	TTM Revenue (A$m)	2028 Consensus EV/Revenue (x)
Environmental Clean Technologies	**ASX:ECT**	**MXene and advanced materials development**	**N/A**	**N/A**
Tier 1 — ASX Advanced Materials				
Titomic	ASX:TTT	Cold-spray metal additive manufacturing for defence	$11	3.0x
Amaero	ASX:3DA	Refractory metal powders for defence and space	$18	4.3x
Metal Powder Works	ASX:MPW	Precision metal powders for additive manufacturing	$3	17.8x
AML3D	ASX:AL3	Wire-arc additive manufacturing of large defence parts	$6	0.6x
Tier 2 — International Speciality Materials				
Velo3D	NASDAQ:VELO	Metal additive manufacturing systems for aerospace/defence	$80	3.0x
Park Aerospace	NYSE:PKE	Composite materials for military aircraft and radomes	$106	6.5x
Peer Median			***$14***	***4.3x***
Peer Mean			***$37***	***6.9x***

Source: Capital IQ.

Faster commercial adoption could lift MXene value to A$43 million

Our bull case for CY28 assumes ECT progresses through defence qualification faster than in our base case, allowing a greater proportion of qualified MXene output to convert into commercial sales. This could be supported by successful validation with defence customers, initial small repeat orders, larger development programs and earlier conversion into contracted supply.

Our bull case assumes a faster defence sales cycle.

Our sensitivity analysis (Figure 21) looks at the relationship between MXene pricing and sell-through. Our base case assumes 35% sell-through at a A$69/g ASP, generating A$6.7 million in revenue, while our bull case assumes 40% sell-through at an A$90/g ASP, generating A$9.9 million in CY28. Applying our valuation methodology, this implies a contribution of approximately A$43 million to our bull-case SOTP valuation, or roughly A$0.10 per share.

Figure 21: CY2028 revenue sensitivity (A$m): sell-through vs average selling price

Sell-through ↓ / ASP (A$/g) →	A$27.0	A$48.0	A$69.0	A$90.0	A$111.0
25.0%	A$1.9	A$3.3	A$4.8	A$6.2	A$7.7
30.0%	A$2.2	A$4.0	A$5.7	A$7.5	A$9.2
35.0%	A$2.6	A$4.6	A$6.7	A$8.7	A$10.7
40.0%	A$3.0	A$5.3	A$7.6	A$9.9	A$12.3
45.0%	A$3.4	A$6.0	A$8.6	A$11.2	A$13.8

Source: Pitt Street Research estimates.

Figure 22: ECT Sum-Of-The-Parts Valuation

Valuation (A$m)	Base Case	Bull Case
Equity Value of PFAS Peer Group (A$m)	95.4	120.4
Equity Value of MXene Peer Group (A$m)	29.0	43.0
Total Equity Value	**124.4**	**163.4**
Shares outstanding	448.5	448.5
Implied price (A$)	**0.28**	**0.36**
Current price (A$)	0.11	0.11
Upside (%)	**152%**	**231%**

Source: Pitt Street Research estimates, Company.

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Risks

1. Scale will put pressure on MXene pricing

The biggest analytical caveat is that today's US$100–400 per gram pricing is largely a function of constrained supply and immature production methods. If Flash Joule Heating proves commercially scalable, alongside other emerging production breakthroughs, MXene supply should increase materially and pricing should naturally compress over time.

We expect the market to become increasingly segmented between customised, application-specific MXenes that can command premium pricing and more standardised formulations that are likely to become increasingly commoditised. This means the pricing environment investors see today is unlikely to be representative of the market several years from now as production scales and competition increases.

Importantly, a market in which manufacturers can consistently charge several times their underlying production cost is unlikely to be sustainable over the long term. As manufacturing capacity expands, we would expect margins on more commoditised MXenes to normalise, with premium pricing increasingly reserved for differentiated formulations where performance, purity or customisation provides genuine value to the end customer.

2. FJH still needs to prove it can scale

Flash Joule Heating remains at an early stage of validation and scale-up for MXene production. The process applies an intense electrical current through a material, rapidly heating it to temperatures of up to ~3,000°C within seconds to minutes, depending on scale. While this creates the potential for fast and highly scalable production, MXenes can vary significantly in structure, composition and yield depending on process conditions.

ECT therefore still needs to demonstrate that FJH can consistently produce high-quality MXenes at strong yields, with limited batch-to-batch variation, as production volumes increase. This creates an important technology and scalability risk. However, Metallium's progress using FJH across mineral recovery and printed circuit board applications provides some early evidence that the underlying reactor platform can operate reliably at increasing scale.

For investors, it is important to stay grounded, Metallium has demonstrated encouraging operational progress with FJH, but its successful application and scale-up for MXene production is not yet proven.

3. Production success does not guarantee customer adoption

There is not yet an established commercial MXene market at meaningful volume, which makes the timing and scale of future contracts and partnerships difficult to assess (This is a feature in emerging technologies not a bug). In our view, EMI shielding and defence applications represent the most likely pathway to near-term revenue, given the performance characteristics MXenes can potentially offer in lightweight, conductive coatings.

The challenge is that incumbent solutions, including metal foils, conductive coatings and ferrite-based materials, are relatively low-cost, already qualified and deeply embedded within existing product designs. Qualification cycles in electronics and defence can also extend over several years, meaning any material substitution needs to deliver a sufficiently compelling performance advantage to justify redesign and requalification.

As a result, ECT could execute successfully on MXene production and still face slower-than-expected commercial adoption within our forecast period. Based on our discussions with management, however, the team remains confident in the underlying demand outlook and believes there is growing customer interest in potential MXene applications.

Appendix I – Analyst Qualifications

Stuart Roberts, lead analyst on this report, has been an equities analyst since 2002.

– Stuart obtained a Master of Applied Finance and Investment from the Securities Institute of Australia in 2002. Previously, from the Securities Institute of Australia, he obtained a Certificate of Financial Markets (1994) and a Graduate Diploma in Finance and Investment (1999).

– Stuart joined Southern Cross Equities as an equities analyst in April 2001. From February 2002 to July 2013, his research speciality at Southern Cross Equities and its acquirer, Bell Potter Securities, was Healthcare and Biotechnology. During this time, he covered a variety of established healthcare companies, such as CSL, Cochlear and Resmed, as well as numerous emerging companies. Stuart was a Healthcare and Biotechnology analyst at Baillieu Holst from October 2013 to January 2015.

– After 15 months over 2015–2016 doing Investor Relations for two ASX-listed cancer drug developers, Stuart founded NDF Research in May 2016 to provide issuer-sponsored equity research on ASX-listed Life Sciences companies.

– In July 2016, with Marc Kennis, Stuart co-founded Pitt Street Research Pty Ltd, which provides issuer-sponsored research on ASX-listed companies across the entire market, including Life Sciences companies.

– Since 2018, Stuart has led Pitt Street Research's Resources Sector franchise, spearheading research on both mining and energy companies.

Charlie Youlden is an associate equities research analyst at Pitt Street Research.

– Charlie holds a Bachelor of Business and Commerce from the University of Technology Sydney. He has also completed the Value Investing Program at Columbia Business School and the Wall Street Prep Financial Modeling course.

– He joined Pitt Street Research in 2025, following experience as the founder of his own business and as an FX hedging broker.

– Charlie has authored equity research reports on ASX-listed and US technology companies and actively shares market insights with a growing professional audience.

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