7 April 2020

Exclusive global Licence Agreement to produce Synthetic Zeolite

Metalsearch Limited (MSE or the Company) is pleased to announce it has secured an exclusive worldwide licence from UniQuest, the technology transfer company of The University of Queensland (UQ) for the manufacturing (synthesising) of zeolites (Technology). MSE will also implement commercialisation of the patent-pending processing Technology.

Summary

- UQ's School of Chemical Engineering Associate Professor James Vaughan and Dr Hong (Marco) Peng have developed a novel approach to manufacture synthetic zeolites, from kaolin feedstock
- Synthetic zeolite applications primarily include **water treatment** (purification and separation), **detergent builders** and cracking processes in the **petroleum industry**
- The 2019 global synthetic zeolite market was estimated at USD $5.64 billion [1]
- UQ's processing technology is a **synergistic fit to MSE's Abercorn Project, as the primary feedstock is kaolin**
- The Technology presents a potential opportunity to **fast track development of the Abercorn Project, with a low capital cost to commercial production**
- The Technology has the potential to significantly reduce the cost of manufacturing zeolites - compared to current production processes. UQ has demonstrated the following under lab scale conditions for the formation of certain synthetic zeolites:
    - Up to 70% reduction in energy in the thermal activation stage
    - Up to 80% reduction in production time in subsequent zeolite precipitation steps
    - These results also underpin a process that could expand the application of synthetic zeolites, by reducing costs and making their unique frameworks more accessible to wider applications
- The collaboration further strengthens MSE's relationship with UQ, which has one of Australia's leading chemical engineering schools and UniQuest. UniQuest will also join the MSE share register after completion of the licence transaction
- The Technology will also allow MSE to pursue sub-licensing agreements to existing synthetic zeolite manufacturers and end users.
- Highly experienced former Westpac Group senior corporate banker Peter Zardo has been appointed Chief Operating Officer (COO), to drive commercialisation of the Technology and development of the Abercorn Project

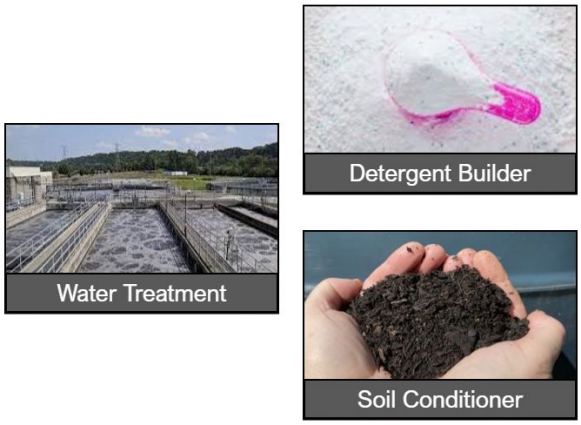
[1] Verified Market Research Report "Global Synthetic Zeolite Market Size & Forecast to 2026"

About synthetic zeolites and end market opportunity

Synthetic zeolites are manufactured aluminosilicate minerals with a sponge-like structure (framework), made up of tiny pores that make them useful as catalysts or ultrafine filters.

They are commonly known as molecular sieves and can be designed to selectively adsorb molecules or ions.

The selectivity properties of different synthetic zeolites enable them to be effective in wastewater treatment applications**.**



Synthetic zeolites are also used as **water softeners** and **water filters.**

<u>The growing adsorbents market</u>

According to Verified Markets Research, the global adsorbents market is predicted to grow extensively over the period 2020 to 2026. Rapid industrialisation, especially in the emerging economies of China and India, has been one of the fundamental elements driving global adsorbent sales.

The rise in adoption of synthetic zeolite based adsorbents in major end use industries including **water treatment**, chemicals and petrochemicals particularly in the Asia Pacific, Middle East and Latin America has boosted the growth of the market and this is expected to continue over the next decade.

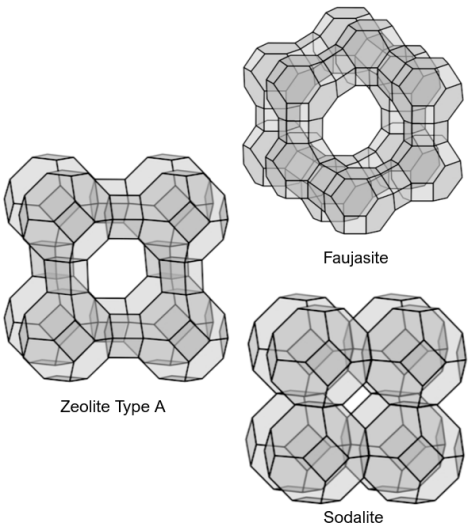
Rising environmental concerns regarding **wastewater** health hazards have triggered regulatory bodies across the globe to mandate the use of synthetic zeolite based adsorbents. The stringent regulatory norms specifically in the U.S. and Europe to disinfect both water and air have also been boosting the demand for adsorbents.

Synthetic zeolites also play an important role as ion exchangers in many everyday **dishwashing and laundry detergents**, assisting to remove calcium and magnesium and thereby softening water so they work more effectively. Synthetic zeolites are sought after as a detergent builder as they present an environmentally friendly substitute for phosphates (which are banned in the USA, Europe, Australia and some parts of Asia).

For example, some major cities in China have banned the use of phosphates as a detergent builder, due to it being a primary contributor to blue green algae toxicity, whilst others are yet too. **MSE believes a materially lower cost of production for synthetic zeolites could accelerate the transition away from phosphate use to environmentally friendly detergent builders.**

Synthetic zeolite is also used as a catalyst in the **pharmaceutical and petroleum industries**, in catalytic crackers to break large hydrocarbon molecules into gasoline, diesel, kerosene and waxes.

Agricultural application of synthetic zeolites is in **soil conditioners.** The complex framework of pores in a zeolite's open structure trap atoms and molecules, enabling chemical reactions to take place.



This is the reason why synthetic zeolites are sometimes referred to as space selective catalysts (they can select the molecules they work on in other ways beside shape and size).

Global zeolite market data

According to Verified Markets Research the Global Zeolite Market (2019) has a total estimated value of USD $13.9 billion per annum. This parent market includes synthetic zeolites which represent circa 40% of the total value.

GLOBAL ZEOLITES MARKET, BY APPLICATION, 2017 – 2026 (USD MILLION)[2]

By Application	2017	2018	2019	2026	CAGR%
Detergents	8,126.3	8,318.3	8,517.8	10,390.5	2.88%
Catalysts	2,397.6	2,457.6	2,520.0	3,119.5	3.10%
Absorbents	1,943.7	1,987.5	2,032.9	2,467.7	2.81%
Others	812.4	827.6	843.4	993.5	2.37%
Total	**13,279.9**	**13,590.9**	**13,914.1**	**16,971.3**	**2.88%**

Detergents accounted for the largest market share of 61% in 2019, with a market value of USD $8.517 billion and are projected to grow at a CAGR of 2.88% during the forecast period.

[2] Verified Market Research Report "Global Synthetic Zeolite Market Size & Forecast to 2026"

GLOBAL ZEOLITES MARKET, BY TYPE, 2017 – 2026 (USD MILLION)

By Type	2017	2018	2019	2026	CAGR%
Natural	7,926.6	8,096.4	8,272.5	9,924.3	2.63%
Synthetic	5,353.3	5,494.5	5,641.6	7,047.0	3.23%
Total	13,279.9	13,590.9	13,914.1	16,971.3	2.88%

The synthetic zeolite market was valued at USD $5.64 billion in 2019 and is projected to grow at the highest CAGR of 3.23%.

Synthetic zeolites processing technology and intellectual property (IP)

UQ's School of Chemical Engineering Associate Professor James Vaughan and Dr Hong (Marco) Peng developed the novel approach to the synthesis of adsorption materials (zeolites) from kaolin and clay minerals which forms the core Technology.

The UQ synthetic zeolite processing technology has the potential to significantly reduce the cost of manufacturing synthetic zeolites. UQ has demonstrated the following under lab scale conditions for the formation of certain synthetic zeolites:

- Up to 70% reduction in energy in the thermal activation stage;
- Up to 80% reduction in production time in subsequent zeolite precipitation steps.

The IP has been exclusively licensed by MSE from UniQuest, which is the technology transfer company of UQ.

UniQuest filed a provisional patent application for the Technology in 2019.

The Technology continues to be the subject of ongoing development which will be undertaken by UQ under the terms of a research agreement with the Company. This work will better define the technical parameters needed to commence construction of a pilot plant ("Pilot Plant") to test the process and produce commercial samples of synthetic zeolite using the Technology.

UniQuest / Synthetic Zeolite Transaction

The consideration payable by the Company for the grant of the licence under the licence agreement (Licence Agreement) is:

(a) $150,000 in cash as an upfront licence fee;
(b) a further licence fee of $600,000 to be satisfied by the issue of ordinary fully paid shares (MSE Shares) with a value of $600,000 based on a 30 day volume weighted average price; and
(c) a 5% royalty on gross sales of synthetic zeolites produced using the Technology.

The Company has further agreed that in the event that a patent is granted or on the successful production of three five kilogram batches of type A synthetic zeolite from the Pilot Plant that it will at that time pay a success milestone of $600,000 either in cash or by way of the issue of MSE Shares calculated on a 30 day VWAP (at the Company's election).

The Licence Agreement also gives the Company the option, within specified circumstances, **to acquire the Technology and the intellectual property rights**, subject to the payment of an assignment fee.

Under the term of the Licence Agreement entered into between the Company and UniQuest, the Company has been granted an exclusive worldwide licence to commercialise and use the Technology to produce synthetic zeolite for a term of twenty years or the date of expiration of the last to expire patent granted in any country.

The Licence Agreement is legally binding on the parties. The material terms are set out below.

The Licence Agreement is subject to several conditions subsequent which must be satisfied at various milestone dates. If the conditions subsequent are not satisfied by the relevant milestone dates UniQuest may terminate the Licence Agreement or choose to waive the relevant condition. The conditions subsequent are as follows:

(a) the parties entering into a research agreement for a minimum of $400,000 and a three year term within 30 days of the date of the Licence Agreement. The research to be undertaken by UQ under the research agreement is to finalise the technical aspects of the Technology upon which a Pilot Plant will be constructed (amongst other purposes);

(b) the Company completing and operating a pilot plant for synthetic zeolite within 18 months of the date of the Licence Agreement;

(c) the commencement of commercial production of synthetic zeolite using the Technology within five (5) years from the date of the completion of the Pilot Plant; and

(d) the Company deriving commercial production from a minimum of three (3) countries within six (6) years from the date of completion of the Pilot Plant.

Newly Appointed Chief Operating Officer (COO)

Experienced senior commercial banking executive, Mr Peter Zardo, has been appointed to lead the commercialisation and operations for the Company as Chief Operating Officer.

Mr. Zardo has been a high performing corporate banking director, with the Westpac Group for over 16 years, directly managing medium to large scale commercial enterprise, providing coal-face strategic guidance and business advice during his tenure. Mr. Zardo recently completed Westpac's Emerging Leader Program and was a recipient of the St.George Bank MD Scholarship travelling to the USA and Canada to gain insights on business strategy from global brands such as Apple, Nike and IBM.

Next Steps – Synthetic Zeolite

- Newly appointed COO Peter Zardo to commence executing commercialisation plan.
- Undertaking synthetic zeolite market participant research through several channels, primarily into China which is recognised as a global manufacturing hub for this specialised industrial commodity.
- A comprehensive market scoping and industry analysis, that will enable targeting of potential future joint venture and offtake partners.

Dr. Dean Moss, CEO, UniQuest, commented

"UniQuest is very pleased to have partnered with MSE for this promising UQ technology. The technology used to produce the synthetic zeolite has shown potential to reduce energy consumption and time, compared to traditional methods in lab experiments.

With the MSE licence in place and an associated research agreement to follow shortly, we are excited to support MSE to explore broader use across multiple industry applications and further commercialise the technology to create change."

Mr Peter Zardo, COO, Metalsearch commented

"It's an exciting time to join Metalsearch with the addition of an innovative new technology that has the potential to disrupt the synthetic zeolite manufacturing market. Our relationship with The University of Queensland continues to strengthen and we now have a significant opportunity to leverage our Abercorn deposit and combine it with world leading Kaolin technology.

We are committed to extracting the significant benefits of this opportunity and commercialising it for MSE's Abercorn Project and broader market applications. We would like to thank UQ and UniQuest for introducing this technology to MSE and enabling the licence agreement.

MSE now has the potential for reporting a strong maiden JORC resource on its Abercorn project, exciting technology and Executive capability to go to the next level, we all look forward to the journey ahead and updating the market as we progress."

This Announcement has been approved by the Board.

- End –

For further information please contact:

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About the Abercorn Project

The Abercorn Project is a large-scale kaolin prospect located in central Queensland.

Abercorn's kaolin mineralisation has the potential for the extraction of marketable volumes of higher-grade Al_2O_3 feedstock. The Abercorn project was originally drilled with 24 holes in 2007. This drilling has now been extended, with the recent drilling of an extra 62 holes, comprising 2,358m (assays pending). The total number of holes drilled for the project is now 86 for a total of 3,172m.

- 86 RC holes drilled - kaolinite intersected in every hole
- Large scale mineralised system from surface
- Resource remains open in all directions
- High Grade Al_2O_3 assay results include 33.71% Al_2O_3[1]
- Low cost operation - straight forward open cut mining
- Little to no overburden
- Low impurities
- Main sealed highway adjacent to the deposit
- Mains power on site / major power transmission line within 5km of site
- Large water supply nearby and within EPM
- Close to two deep water ports

The Abercorn Project is situated approximately 135km south of the deep-water port of Gladstone and 125km west of the deep-water port of Bundaberg in central Queensland. Both of these major ports are connected to the Abercorn Project by sealed roads. The Burnett highway bisects the tenements.

[1]See Metalsearch Limited ASX Announcement 13 August 2019. The Company is not aware of any new information or data that materially affects the information included in the referenced ASX announcement and confirms that all material assumptions and technical parameters underpinning the estimates in the relevant market announcement continue to apply and have not materially changed. The company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcement