

7 May 2020

Synthetic Zeolite Research Agreement signed with the University of Queensland

Metalsearch Limited (ASX: MSE, “Metalsearch” or “the Company”) is pleased to announce it has executed the research agreement (“Research Agreement”) with The University of Queensland (“UQ”) for the continued research and development of the patent-pending mineral processing technology for the manufacturing (synthesising) of zeolites (“Technology”) (*refer ASX announcement dated 7 April 2020 – Exclusive global Licence Agreement to produce Synthetic Zeolite*).

Summary

- The Research Agreement follows the execution on the 7th April 2020 of an exclusive worldwide licence agreement from UniQuest, the technology transfer company of UQ for the manufacturing (synthesising) of zeolites
- UQ has developed a novel approach to the production of synthetic zeolites - manufactured minerals which are widely used in **detergent and wastewater treatment applications**
- The 2019 global synthetic zeolite market was estimated at **USD \$5.64 billion**¹
- The research agreement provides resources to accelerate technical delivery of Technology developed by The University of Queensland’s School of Chemical Engineering
- UQ has confirmed that **Abercorn Project kaolin is a highly suitable feedstock** for the process
- The purpose of the Research Agreement is to expand the understanding of mineral processes and apply these to deliver successful piloting outcomes – **the aim is to achieve continuous sample generation of commercial grade zeolite product**. The research work will primarily comprise of studies that will:
 - expand the understanding of mineral processes to fast-track design and planning of the pilot plant;
 - support pilot plant development, construction and commissioning;
 - drive product sample generation and enhance technical marketing purposes of zeolite samples; and
 - explore experimental research on applications for different zeolites
- All intellectual property resulting from the Research Agreement will form part of the exclusive worldwide licence agreement held by Metalsearch – which contains within specified circumstances, the ability for Metalsearch to acquire

¹ Verified Market Research Report “Global Synthetic Zeolite Market Size & Forecast to 2026”

the Technology and the intellectual property rights subject to the payment of an assignment fee.

Lowering the cost of production for zeolites

Researchers from UQ's School of Chemical Engineering have developed a novel approach to the production of synthetic zeolites – manufactured minerals which are widely used in detergent and wastewater treatment applications.

Synthetic zeolites – commonly known as molecular sieves – have a sponge-like structure made up of tiny pores, making them useful as catalysts or ultrafine filters, and can be designed to selectively adsorb molecules or ions.

They are often used as water softeners, water filters, and 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.

Rising environmental concerns regarding wastewater health hazards have triggered regulatory bodies across the globe to mandate the use of synthetic zeolite based adsorbents.

The selectivity makes synthetic zeolites environmentally effective in water treatment applications, as they can be applied to polluted water.

Metalsearch is focused on commercialising this new proprietary technology which can make a range of zeolite products beginning with low cost feed (kaolinite / clay-containing mine tails) with controllable impurity levels. The objective is to develop a mineral process that materially lowers the costs of production for this in demand² specialised industrial commodity and leverage the benefits of vertical integration by applying kaolin feedstock from the Abercorn Project.

Scope of research agreement

Laboratory studies to-date undertaken by Associate Professor James Vaughan and Dr Hong (Marco) Peng have culminated in developing a patent-pending mineral processing technology.

The initial phase of the Research Agreement will focus on studies to expand the understanding of processes which will fast-track design and planning of the pilot plant. The program will work in unison with pilot plant development, construction and commissioning. The final stage will revolve around product sample generation and enhancing technical marketability of zeolite samples, in conjunction with experimental research on applications for different zeolites.

² Verified Market Research Report “Global Synthetic Zeolite Market Size & Forecast to 2026”

Next steps

Synthetic zeolite

- Commence Research Agreement - setting the groundwork for pilot plant design and planning;
- Complete comprehensive market scoping and industry analysis that will enable targeting of potential future offtake partners;
- 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 (research team in mainland China to be engaged);
- Investigating suitable process engineering and met lab supply partners; and
- Explore opportunities for collaboration to underpin expanding commercial potential of patent-pending mineral processing technology

Abercorn Project

- Deliver maiden JORC Mineral Resource
- Conduct Kaolin marketability testing program, including:
 - Specialised Halloysite testing;
 - ISO brightness and particle fineness testing; and
 - Assess kaolin aligned to end user product requirements

Dr. Dean Moss, CEO, UniQuest, commented

“Following the signing of the licence agreement we are now pleased to see the research program in place and are really looking forward to it commencing.”

Mr Peter Zardo, COO, Metalsearch commented

“We are delighted to be working with chemical engineers of the highest-calibre from the University of Queensland, which is ranked as the top university in Australia for environmental engineering research³.

The opportunity to be part of developing exciting proprietary technology with the potential to disrupt the synthetic zeolite manufacturing market is compelling.

I will focus on accelerating the commercialisation of our tech from a market interest perspective, whilst the team at UQ press forward at pace with technical delivery.”

³ <https://www.chemeng.uq.edu.au/research>



This Announcement has been approved by the Board.

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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. The total number of holes drilled into 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 major ports are connected to the Abercorn Project by sealed roads. The Burnett highway bisects the tenements.

¹See 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