

The Manager Companies - ASX Limited
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ASX Announcement
14 January 2025
(4 pages)

SIGNIFICANT ACCELERATION IN SEMICONDUCTOR SECTOR DEMAND

SEMICONDUCTOR SECTOR

- A significant lift in demand from the semiconductor sector has been identified
- Increased demand is dominantly flowing from 2 applications:
 - Thermal interface materials for chip encapsulation, and
 - CMP slurries for wafer polishing
- Letter of Intent (LOI) received from a market leader in thermal interface materials for both Stage 1 and Stage 2 of the HPA First Project
- Alpha's novel purification process is uniquely matched to the demanding alumina quality requirements of each of these applications, able to:
 - produce ultra-high purity aluminas with zero radio-nuclides, and,
 - produce ultra-high purity aluminas with high CMP removal rates at the required chemical profile at lower temperatures
- The Stage 1 production facility is now adjusting to maximise high purity alumina hydrate (ATH) production to meet qualification sample demand

Alpha HPA Limited (**Alpha** or **the Company**) (ASX: A4N) is pleased to provide an update on semiconductor sector marketing activities which are positively impacting both **Stage 1** and **Stage 2** of the HPA First Project in Gladstone, Queensland.

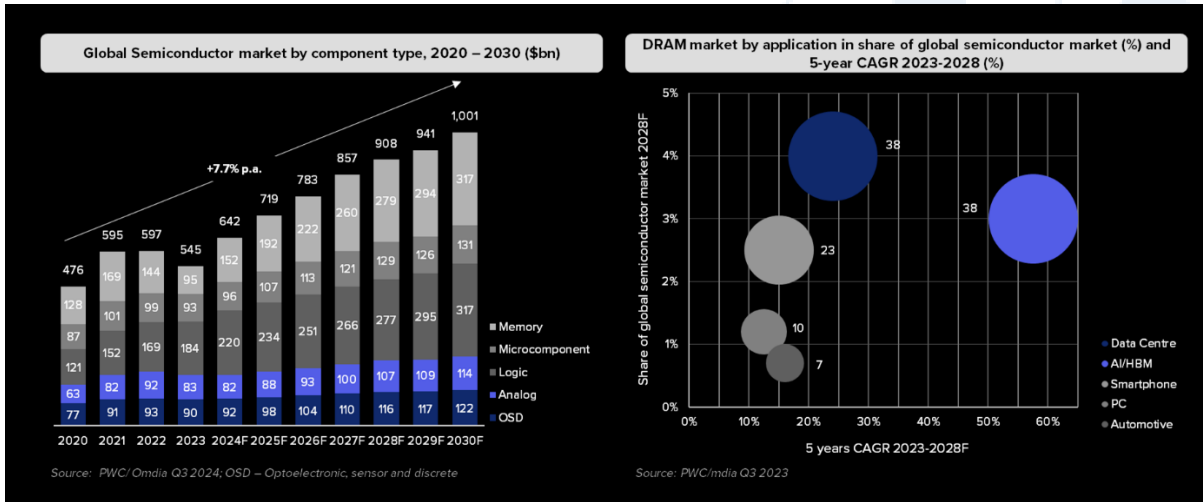
Alpha's Managing Director, Rimas Kairaitis said, "Alpha is delighted to note demand from the semiconductor sector has started to escalate rapidly. More detailed interaction with end-users is confirming that Alpha's novel purification process is uniquely matched to the demanding alumina quality requirements of each of the semiconductor sector applications."



SEMICONDUCTOR SECTOR DEMAND

Sector Comment

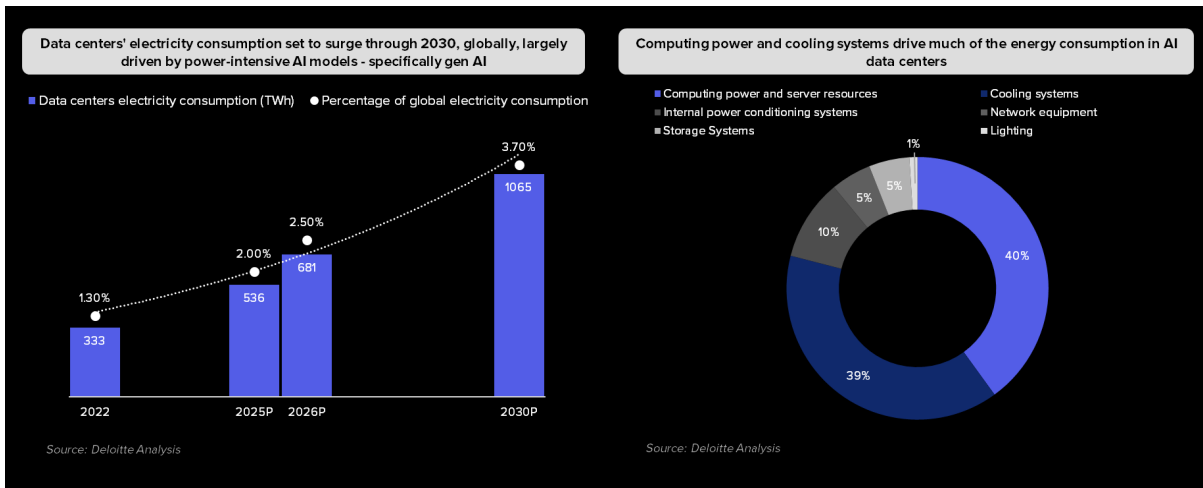
Alpha notes the global semiconductor sector is undergoing extraordinary growth driven by artificial intelligence (AI) data centres and power semiconductors for the energy transition – see charts below:



Thermal Interface Materials

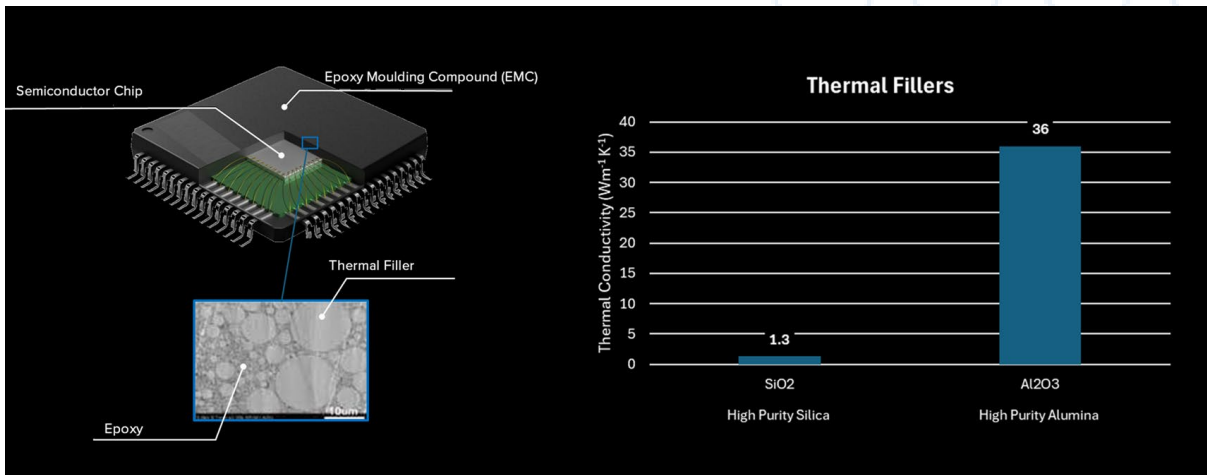
The high purity alumina-based demand for semiconductor packaging is driven by the requirement for better heat management in large data centres.

- Faster processing power is driving higher heat outputs, resulting in surging electricity demand for AI data centres with 40% of electricity for required for cooling (see graphic below).
- This is placing an intensive focus on thermal management.



The intense focus on thermal management means that increased thermal conductivity in semiconductor encapsulation is now a necessity.

The superior thermal conductivity of high purity aluminas is driving alumina demand over the use of incumbent silica (see graphic below).



CMP Sector Demand

Semiconductor substrates and stacked circuit layers are polished with a process referred to as CMP, which stands for Chemical Mechanical Planarization.

The CMP process uses combined physical and chemical abrasion which to date have typically included silicon and yttrium oxide as the dominant physical abrasives.

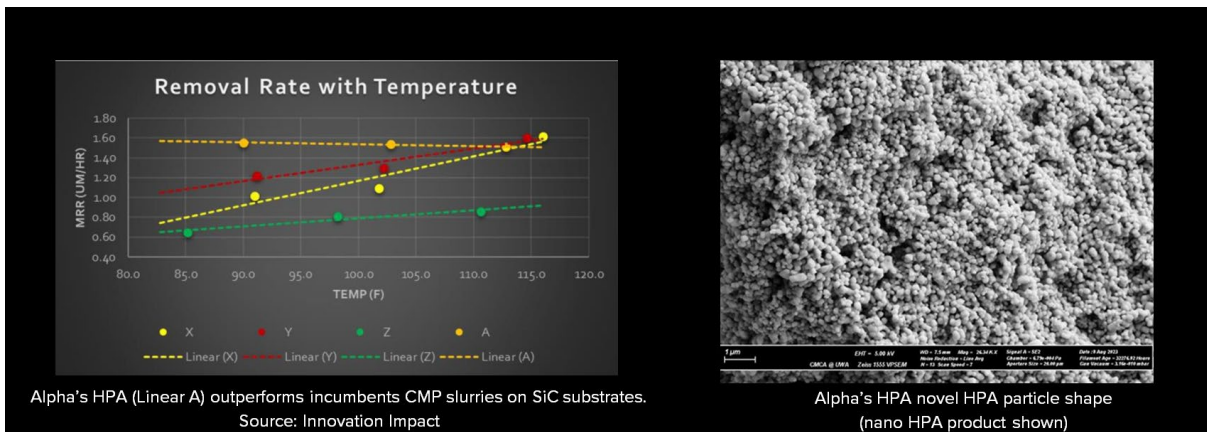
The rapid growth of harder substrates for power-semiconductors, such as Silicon Carbide (SiC), Gallium Nitride (GaN) and Sapphire (Al₂O₃) is rapidly leading to more and more high purity aluminium oxide (HPA) as the preferred CMP abrasive.

Alpha's CMP Advantage

Alpha's novel process can produce aluminas with a unique particle shape and impurity profile that is uniquely suited to high-performance CMP slurry abrasive applications.

Alpha's materials have been independently tested to show higher CMP removal rates than incumbent CMP slurries at lower temperatures, reducing warping of the substrate (see below).

Alpha has already commenced small scale commercial sales to leading CMP end-users in the US and is in advanced qualification with end-users in Japan, China and the US. Recent end-user testwork has been highly encouraging, confirming the benefit of Alpha's materials.



Demanding purity specifications

Purity standards for thermal fillers/thermal interface materials for new-generation semiconductors are extremely stringent and must contain ZERO detectable radio-nuclides (less than 1 part per billion)

Radio-nuclides emit alpha (α) particle radiation which disrupt secondary signals and create 'soft errors'.

Critically, Alpha's novel purification process removes all radio-nuclide impurities, unlike incumbent manufacturers, making it ideally suited to meet the thermal filler application.

Stage 1 Facility response

Alpha has seen a material lift in product sales orders from Stage 1 from counterparties in the semiconductor sector to allow them to complete production scale testwork. In particular, demand for high purity alumina hydrate (**Al(OH)₃** or **ATH**) have significantly increased.

The Stage 1 facility is implementing a number of equipment and flow sheet changes to increase production output to meet higher volume orders, primarily for ATH, over a shorter timeframe.

Semiconductor sector sales and Letters of Intent

The Company has been active in qualification testing and small scale product sales from a range of end-users in semiconductor sector, for both thermal interface materials and for CMP applications.

The Company is very pleased to note it has received a signed Letter of Intent (**LOI**) to purchase Alpha's high-purity materials from a market leader in the thermal interface sector. This includes commercial volumes from Stage 2 from CY2027 and the intent to continue and scale up orders from Stage 1 over CY2025 and CY2026.

This LOI is seen as further endorsement of the adoption of Alpha's materials into this semiconductor sector and the Company's ability to meet stringent quality standards.

The Company is also negotiating further LOIs with end-users in the semiconductor sector.

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About the HPA First Project

The Company's HPA First Project represents the commercialisation of the production of high purity aluminium materials using the Company's proprietary, exclusively licensed solvent extraction and HPA refining technology. The disruptive, low-carbon process technology provides for the extraction and purification of aluminium from an industrial feedstock to produce 4N (>99.99% purity) and 5N (>99.999% purity) aluminium materials for sale into high technology markets including the semiconductor, lithium-ion battery and LED lighting sectors.

Alpha is in production at its HPA First Project Stage 1, Precursor Production Facility (PPF) across the Company's full range of high purity aluminium materials and has commenced construction of Stage 2 of the HPA First Project.

On 20 May 2024, Alpha reached Final Investment Decision for Stage 2 of the HPA First Project, being the full commercial scale deployment of the process technology on the same site.

Alpha has commenced construction of Stage 2 of the HPA First Project, which will be the world's largest, single site facility for the manufacture of high purity aluminium materials.