AUSTRALIAN BAUXITE LIMITED

ASX ANNOUNCEMENT
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AlF_3 for Aluminium smelters & Lithium ion batteries. Corethane: as clean as gas

5th Milestone Achieved: Alcore Produces Commercial-Grade AlF_3

- Australian Bauxite Limited (**ABx**)'s 89%-owned subsidiary, ALCORE Limited (Alcore) is conducting advanced laboratory production of aluminium fluoride (AlF_3) from aluminium smelters' by-product waste materials and producing AlF_3 from ABx's clean bauxite.
- Alcore has received chemical analyses from CSIRO Laboratory, Melbourne which confirm that recent AlF_3 produced by Alcore achieved commercial chemical grades. See Table 1 next page.
- This commercial-grade AlF_3 was made from 30% dross waste and 70% gibbsite mineral. A new pre-treatment method had been applied to both compounds that appears to work well.
- AlF_3 is a strategically important mineral product because it is a key ingredient in the smelting of aluminium metal and reduces the electrical power consumption per tonne of aluminium. It is also used in the new-generation rechargeable lithium ion battery industry.
- Alcore is planning to be the first domestic producer of AlF_3 so as to diversify supply for Australasian smelters and to export to other smelters world-wide.
- Alcore's method is the world's first production of ALF_3 from the recycling of smelter waste and low-grade bauxite and uses the aluminium-related parts of the CORE Technology (patent pending).
- **Alcore has now proven it can**:
  1. Make aluminium fluoride (AlF_3) of acceptable saleable grade from aluminium oxide minerals in bauxite and other aluminium-rich material that is amenable to treatment by Alcore.
  2. Make AlF_3 in a crystalline form that is needed for use in aluminium smelting
  3. Remove deleterious elements by adjusting the reagent mix and processing conditions
  4. Manufacture saleable Corethane gas-substitute by reducing ash content in coal from 28% to 0.3%, thus making an ideal, ultra-clean substitute for coke and ideal for industrial heating as a substitute for gas and diesel.
- **Milestones:** Alcore's task list includes the following:
  1. Determine the optimum reaction conditions for the extraction of iron oxides. **DONE.** This has been achieved chemically and is now focussed on filtering the iron particles from solutions.
  2. Prove that Alcore can make commercial-grade AlF_3 which involves both chemical and physical parameters. This is well advanced now that satisfactory chemical grades are being achieved. The task is to make the crystals at the right size. **UNDERWAY**
  3. Make commercial-grade AlF_3 from economically attractive waste materials. **DONE**
  4. Create commercial-grade AlF_3 for testing by prospective AlF_3 customers. **IN PROGRESS**
  5. Make high purity AlF_3 from gibbsite (Al_2O_3. $3H_2O$, the main ore mineral in ABx's bauxite) that can be used in next generation batteries. This R&D work is **UNDERWAY**
  6. Making low-cost acid reagents from aluminium smelter by-products. **IN PROGRESS**
  7. Reduce ash content in Corethane to below 0.5%. **DONE**
  8. Finalise the process flow diagram and commence the engineering design work. **UNDERWAY**

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Table 1:

Chemical analyses of commercial-grade AlF_3 and recent Alcore AlF_3 product analysed by CSIRO Melbourne lab

Element	Al % Aluminium	F % Fluorine	Fe_2O_3 % Iron	SiO_2 % Silica	Na_2O % Sodium	CaO % Calcium	P_2O_5 % Phosphate	MgO % Magnesia
Commercial grade AlF_3	AlF_3 > 90%		0.05%	0.28%	0.60%	0.09%	0.035%	0.003%
Alcore AlF_3 product 12May'20 analysed by CSIRO	91%		0.06%	0.29%	0.33%	0.05%	0.006%	0.035%

Production of high quality Alcore AlF_3 is being repeated at the Alcore Research Centre this week.

Figure 1: Stages in the value-adding production of the above AlF_3 sample sent to CSIRO Lab for analysis

Raw dross (-$0) | **Filtered solution** | **AlF_3 formed by dehydration** | **Calcined AlF_3 (US$1200/t)**

COMMERCIAL ISSUES

- AlF_3 is an essential electrolyte ingredient in aluminium smelters. Global demand for AlF_3 increases as aluminium smelter production increases and the use of AlF_3 in lithium-ion batteries increases.
- Market prices for AlF_3 are mainly **determined by the Chinese export price** set on the basis of Free-on-Board in Chinese Ports which is a published daily and monthly by Chinese Customs, like bauxite, alumina and aluminium prices are published.
- Market prices are still around the long-term average price of US$1,200 per tonne. See Figure 2.
- Alcore plans to be the first producer of AlF_3 in the southern hemisphere, starting at the production rate of approximately 10,000 tonnes of AlF_3 per year which is a small percentage of the 1.5 million tonne global market for AlF_3.
- Alcore's business plan is to increase production steadily by commissioning 5 of these 10,000 tonne production modules at an industrial site in Bell Bay, northern Tasmania in an industrial precinct that currently has an aluminium smelter, a manganese smelter and an aluminium powder plant all powered by hydro-power. Alcore's recycling strategy would improve the environmental credentials of Bell Bay Aluminium.
- A domestic producer of AlF_3 should increase security of supply for Aluminium smelters in Australasia and elsewhere in the southern hemisphere.
- In the last 12 months, Australasian aluminium smelters imported more than 30,000 tonnes of AlF_3 from China at an average price FOB China of US$1,370 per tonne.
- Co-products from Alcore's production plant include **Corethane gas-substitute**, which is pure hydrocarbon powder, refined from low-value coals that can be used as a gas or diesel substitute (for fuel security in emergencies) and has emissions-reducing industrial applications. It is ideally suited for use as a sulphur-free bunker fuel for shipping under new strict emissions laws.

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Governments

Discussions continue with governments, agencies and with major companies in the aluminium industry. Alcore considers AlF_3 to be a strategically important mineral product.

Figure 2:
Chinese AlF_3 Export Prices and Tonnages.
Data from Chinese Customs

Comment: ABx CEO, Ian Levy commented: "The Alcore Research Centre is a leading-edge laboratory that has enhanced the technology significantly. We have developed a low-risk plan for the first production module at Bell Bay, northern Tasmania. It is the lowest capital cost strategy and simplest design we have. It is planned to present a feasibility study to investors as soon as possible.

We call this strategy "Refine and Recycle". See Figure 3 below.

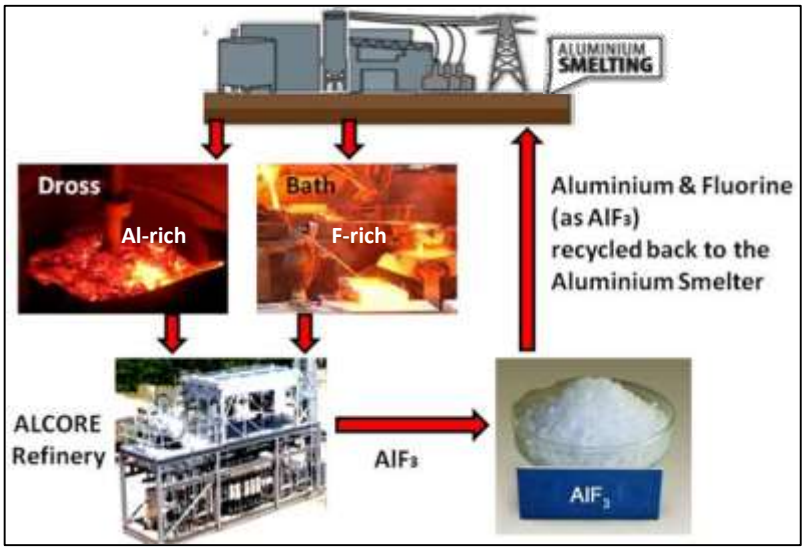

Figure 3
Summary of the Alcore "Refine & Recycle" Business Strategy

This process has the strong potential to be the simplest and lowest cost method to make AlF_3.

It provides an economically attractive way to utilise the aluminium-rich and fluoride-rich by-products from many aluminium smelters worldwide.

Authorised for release by Ian Levy, CEO

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Figure 4

The $2.5 million Alcore Laboratory built inside the Alcore Research Centre

The Alcore Lab is a climate-controlled laboratory constructed inside the Alcore Research Centre for the refining of alumina-rich waste materials and bauxite to produce test samples of AlF_3 and co-products.

It will later become a research centre for testing CORE technologies on many ores and materials

Figure 5: Preparation & Analytical Lab, XRF & furnaces

Figure 6: Alcore test lab, fume cabinets with hi-tech scrubbers, showers, microscopes & Draegar air monitor (wall)

Figure 7: Exterior support systems

a) **Air purification and atmosphere control**

b) **Liquids processing & neutralisation plant**

c) **Duplicated secure LPG gas supply**

d) **Gas-fired Standby-Backup Generator**

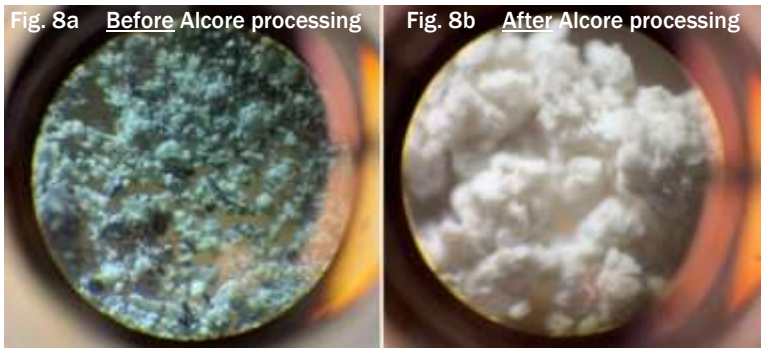

Figure 8

Microscope images showing aluminium smelter by-product in raw form & processed form, refined into an AlF_3 product

The reaction took less than 5 minutes to completion, demonstrating the power of the "brew" reagents used by Alcore

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