# Scandium International Files for Patent Protection on High Purity Alumina Manufacturing Process

written by Raj Shah | May 27, 2021

May 27, 2021 (Source) – Scandium International Mining Corp. (**TSX:SCY**) **("Scandium International" or the "Company")** filed a final patent application with the US Patent Office earlier this month, pertaining to the manufacture of high purity alumina products ("HPA"). The patent application outlines methods, chemistries, processes, and flowsheet design for the manufacture of an HPA product, grading 4N+ purity (99.99%, or better), from either aluminum-containing solution feedstocks, alumina powders, or alumina precursor feedstocks. This application represents a final submission for review and consideration of an award of acceptance and grant.

It is the Company's intent to pursue a business in high purity alumina, and to employ the designs and methods contained in the patent application to manufacture HPA, for application in both the LED lighting industry and the lithium-ion battery industry.

**HIGHLIGHTS – "Process for the Preparation of High Purity Alumina"**

- **Final application filed May 17, 2021, for US Patent Office examination.**
- **Defines methods for refining aluminum feedstocks to HPA product standards.**
- **Includes a multi-step process flowsheet, driven initially by acid leaching.**

- **Employs solvent extraction, ion exchange, and other processes to achieve 4N+ HPA product grades.**
- **Utilizes a closed loop reagent recycling system that generates extremely low levels of process residues and disposable waste, depending on aluminum input source.**

**George Putnam, CEO of Scandium International Mining Corp. commented:**

**"**HPA is becoming more widely recognized as a critical ingredient in a high-energy density lithium-ion battery. HPA is also predicted to remain in supply deficit for much of the next decade, provided the EV markets grow as forecast. The projects we have assembled now, using ion exchange recoveries from copper raffinates (CMR), and solvent extraction/ion exchange recoveries for HPA, can generate a suite of critical metals specifically suited for use in a lithium-ion battery. Market demand timing for these products is excellent. Furthermore, these projects can be located in USA/Canada, and they can produce products from existing feedstocks without creating a new mine footprint."

**DISCUSSION:**

High purity alumina represents a new product target for SCY, although one that has been under consideration by the Company for several years. SCY's recent focus on critical metals recovery ("CMR") from copper raffinates, and other acidic processing solutions in mining applications, raised the prospect of also extracting aluminum from these same solutions. This opportunity formed the basis of a separate provisional HPA patent in May 2020, with recovery and purification concepts tailored to high purity HPA product. The May 2021 HPA final patent application now includes HPA technology production claims related to a wider array of mine-based acidic solution aluminum sources, along with claims for producing HPA from smelter-grade alumina powders, and from alumina precursor feedstocks as well.

The specialty metals and chemicals industries fully understand the challenge of consistently making products that meet the high purity standards required in electrical and semi-conductor applications. These high-quality standards are then generally matched by stronger pricing and higher product margins, which is certainly the case for HPA over common smelter-grade alumina. This opportunity reflects the very high value applications for HPA today, specifically:

- **LED lighting components**. HPA is the foundation for synthetic sapphire manufacture, forming substrates for LED lights, and also for certain semiconductor wafers.
- **Scratch-resistant glass**. Synthetic sapphire is used to form scratch-resistant lenses for wristwatch faces, optical windows, and smartphone components.
- **Lithium-ion batteries (LiB's)**. HPA is applied as a protective coating on separators in LiB's, adding performance, longevity, and safety to high power-density battery configurations. HPA will very likely be used for similar reasons in future solid-state electrolyte and electrode designs.

The Company plans to pursue an HPA development program, including confirmation of both detailed technical production steps and positive initial financial projections, with the intent to enter the HPA business. The HPA effort will focus on Europe and the USA/Canada, both as to markets and production location. HPA initiatives may or may not involve partnering efforts with other companies, depending on the aluminum feedstock source, and other project or partner specifics.

The HPA project effort will be pursued in parallel with our efforts to secure a copper mine host for a project to develop our CMR program, as previously reported.

It is the Company's intent to add a series of related metal

recovery business opportunities alongside the Nyngan Scandium Project, which has otherwise been SCY's primary project and product focus. This change reflects a marketplace priority for production of identified critical metals from new, local sources. Scandium is clearly identified as a critical metal, but it finds nickel and cobalt companions in many orebodies. That fact, along with the Company's CMR capability, has broadened the immediate product opportunity for SCY. This strategy reflects SCY's desire to build a suite of projects that can deliver products tailored directly to lithium-ion battery markets, and specifically to battery components that have application in the electric vehicle industry.

SCY's critical metals recovery programs, including scandium and now HPA, are supported by a series of patent-protected processes and pending protections, filing-date preserved. With these process technology underpinnings in place, and projects scoped, the Company is in position to undertake advanced HPA development and piloting, and to work with project partners, where we require or desire them.

**ABOUT SCANDIUM INTERNATIONAL MINING CORP.**

The Company is focused on developing its Nyngan Scandium Project, located in NSW, Australia, into the world's first scandium-only producing mine. The Company filed a NI 43-101 technical report in May 2016, titled ***"Feasibility Study – Nyngan Scandium Project***." The project has received all key approvals, including a development consent and a mining lease, necessary to proceed with project construction.

The Company is also currently pursuing CMR opportunities with various copper industry groups, where SCY proposes to employ ion exchange technology to extract unrecovered critical metals from existing mine process streams. This program represents a fast-track concept to make battery-grade nickel and cobalt products,

scandium master alloy product, and other critical metals, from North American sources. The Company is similarly pursuing HPA opportunities, both in conjunction with CMR where that is possible, and also independently as a stand-alone project.

Willem Duyvesteyn, MSc, AIME, CIM, a Director and CTO of the Company, is a qualified person for the purposes of NI 43-101 and has reviewed and approved the technical content of this press release on behalf of the Company.

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*This press release contains forward-looking statements about the Company and its business. Forward looking statements are statements that are not historical facts and include, but are not limited to statements regarding any future development of the project. The forward-looking statements in this press release are subject to various risks, uncertainties and other factors that could cause the Company's actual results or achievements to differ materially from those expressed in or implied by forward looking statements. These risks, uncertainties and other factors include, without limitation: risks related to uncertainty in the demand for scandium including scandium alloys and other products produced using the Company's proprietary technologies such as HPA, the possibility that results of test work will not fulfill expectations, or not realize the perceived market utilization and potential. Forward-looking statements are based on the beliefs, opinions and*

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