Scandium International Files Patent Application for Use of Scandium in Lithium-Ion Batteries

written by Raj Shah | September 24, 2020

September 24, 2020 (Source) – Scandium International Mining Corp. (**TSX:SCY**) **("Scandium International" or the "Company")** has filed a provisional patent application with the US Patent Office seeking patent rights on various applications of scandium in lithium ion batteries. The patent application covers a number of scandium enhancements, including doping potential for both anodes and cathodes, and for solid electrolytes.

HIGHLIGHTS:

- **US Patent Application filed for use of scandium in lithium ion battery applications.**
- **Scandium doping applications are explained for anodes, cathodes and electrolytes.**
- **Scandium offers conductivity advantages as a dopant, over other options, and**
- **Scandium in other aluminum components offers numerous property improvements, including conductivity, strength and corrosion resistance.**

DISCUSSION:

Rechargeable lithium ion batteries (LIBs) are a staple of everyday life. The search for improved performance through design and materials advances is intense today. Considerable effort is being expended in developing next-generation materials

for LIBs that will make batteries safer, lighter, more durable, faster to charge, more powerful, and more cost-effective. A sampling of some of the more public efforts are as follows:

- Minimizing or removing cobalt from cathode materials, based on cost, supply and geographic sourcing issues.
- Improving the durability of liquid electrolytes with dopants, or substitution with safer and higher performing liquid or solid electrolyte systems.
- Designing for higher voltage potential by utilizing different anode or cathode materials.
- Determining combinations of metals that can better withstand harsh internal conditions.

Scandium, along with other specialty metals, has a clear role to play in each of these areas.

One particularly promising area for scandium contributions is in a lithium nickel manganese oxide (LNMO) battery. The cathode in this design substitutes manganese for cobalt, and supports a higher nickel content as well. The substitution then delivers higher working potentials (voltage), higher energy densities, and faster charge/discharge rates, all of which offer the promise of improved battery performance.

Delivering on that promise requires a number of improvements, including employing a dopant for stabilization of the manganese in the LNMO cathode, potential stabilization of lithium titanate (LTO) anode materials as well, and use of dopants to improve the conductivity of both these anode and cathode materials. Conventional liquid electrolytes may see improved function and longevity with the improved cathode and anode conductivity. Scandium represents a suitable and effective dopant in each of these applications.

Solid electrolytes represent another potential break-through

improvement in LIBs. They will handle higher voltages, higher temperatures, greater power densities, are potentially easier to package, and are considered safer in use. Scandium represents a suitable and effective dopant in these applications, analogous to the use of scandium to stabilize solid zirconia electrolytes in Solid Oxide Fuel Cells.

Lithium ion batteries employ aluminum in a number of areas, specifically in cathode structure, current connectors, and in general battery structure. Aluminum-scandium alloys represent an enhanced aluminum alloy option, based on their combination of conductivity and strength.

The intent of this SCY patent filing is to advise the battery industry that scandium is a prospective dopant choice for enhanced performance of LIBs, both under existing design parameters and in particular for next-gen LNMO batteries. We want to ensure that battery research and design groups consider scandium additions, amongst their various materials choices, as they race to build a better lithium ion battery.

The Company's operating intent remains focused on producing a scandium product, and advises that it considers the lithium ion battery markets to be a viable application for use.

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

"The quest to improve LIB battery performance is a global research priority today. Doping-element solutions are one primary focus of this research, seeking to realize the best results from various multi-metal combinations. We believe scandium offers real potential for contribution in this area, with an ability to bring improvement to both new and existing battery configurations. Scandium can deliver improvements either by acting as a stabilizing agent with other elements, or

delivering strength to aluminum components, while in both cases maintaining or improving conductivity.”

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 soliciting copper industry interest in using 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.

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.

For inquiries to Scandium International Mining Corp, please contact:

Edward Dickinson (CFO)
Tel: (775) 233-7328

George Putnam (CEO)
Tel: (925) 208-1775

Email: info@scandiummining.com

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, the possibility that results of test work will not fulfill expectations, or not realize the perceived market utilization and potential of scandium sources that may be developed for sale by the Company. Forward-looking statements are based on the beliefs, opinions and expectations of the Company's management at the time they are made, and other than as required by applicable securities laws, the Company does not assume any obligation to update its forward-looking statements if those beliefs, opinions or expectations, or other circumstances, should change.