

# Medallion Updates on Success of Rare Earth Element Separation Technology and Status of Techno-Economic and Life Cycle Assessments

02.06.2021 | [GlobeNewswire](#)

VANCOUVER, June 02, 2021 - [Medallion Resources Ltd.](#) (TSX-V: MDL; OTCQB: MLLOF; Frankfurt: MRDN) - "Medallion" or the "Company", is pleased to announce the successful separation and purification of the magnetic rare-earth elements (REE) neodymium (Nd) and praseodymium (Pr), from US-sourced mineral sand monazite. This is a significant milestone for the Company and highlights the value-add opportunity created by the recent exclusive licensing of the Ligand Assisted Displacement (LAD) Chromatography method and underlying patents from Purdue University (see press release dated 18th February 2021).

## Medallion Separates Neodymium and Praseodymium using LAD Chromatography

- Utilizing the Medallion Monazite Process, the Company extracted REEs from monazite sourced from an operational mineral sand mine in the eastern USA, into a pregnant leach solution (PLS);
- This PLS was passed into the LAD Chromatography process and the target REEs Nd and Pr were extracted directly from solution without the need for additional conditioning or purification of the PLS;
- The high efficiency of the LAD method is in part enabled by the ability to directly extract the highest value and most critical REEs from solution at high purity. Progressive group separation of all REEs (as required by the incumbent solvent extraction method) is not needed within the LAD Chromatography system;
- Published test work by Purdue University demonstrates >99% recovery of REE from solution by the LAD method;
- The LAD method can equally be applied to the direct extraction of heavy REEs dysprosium (Dy) and terbium (Tb) from solution, which will form the basis of additional test work;
- LAD Chromatography can be considered an environmentally friendly process, as it is highly efficient and does not depend upon solvents from the petrochemical industry. The technology was highlighted in a 2020 article in The Journal of Green Chemistry "Two-zone ligand-assisted displacement chromatography for producing high-purity praseodymium, neodymium, and dysprosium with high yield and high productivity from crude mixtures derived from waste magnets";
- Monazite is an REE rich (up to 60% REE) mineral that can be accessed in large volume as a by-product from heavy mineral sand mines in the US, Australia, Africa, and elsewhere. It is consistently enriched in the high-demand metals Nd and Pr which are essential for high strength permanent magnets used in electric vehicles, wind turbines, communication devices and robotics;
- Medallion is developing transferable and scalable technologies for the extraction REEs from monazite. The technologies can be placed in the most economically and environmentally suitable locations to reduce the CO<sub>2</sub> impact of REE production caused by inefficient processes and long-distance transport of raw materials; and
- Medallion is utilizing Life Cycle Assessment to ensure lowest environmental impact process decisions are made.

*"Research and development is generally a slow and progressive process. It is not often we get to witness firsthand the fast pace of an emerging disruptive technology," said Mark Saxon, CEO and President. "It is less than 2 months since we started working with the LAD process at Purdue and already high-purity Nd and Pr carbonates have been separated from a monazite-sourced leach solution. By keeping the REE in solution from end to end, our cost, environmental footprint and recovery efficiency can all be optimized."*

*"This is a real credit to Professor Wang and her team as well as a significant moment for Medallion. It demonstrates how highly developed the simulation, chemistry and physical hardware already is for LAD Chromatography. Our pre-investment review of the LAD system versus peer technology highlighted its potential, and it has been very gratifying to see it over perform."*

The LAD Chromatography method was developed by Linda Wang, PhD, the Purdue Maxine Spencer Nichols Professor of Chemical Engineering at Purdue University. Chromatography is a well-understood and

widely-used technology platform that already delivers large volumes of high-purity chemicals, vaccines, pharmaceuticals, and metals for everyday life. Linda Wang and her team have developed and optimized the method to deliver an environmentally sound technique for REE separation with a particular focus on providing the critical magnetic metals Nd, Pr, Dy and Tb at a customer-ready purity.

The opportunity provided by the LAD system is greatly enhanced by the proprietary supporting simulation system that allows the optimal separation conditions for any REE feedstock to be quickly and cheaply modelled. In the work just completed at Purdue University on Medallion's behalf, the system settings to purify Nd and Pr from monazite sourced PLS were first modelled, with the physical test work then carried out to produce the high purity products without repeated testing or trial and error. The purification was performed using off the shelf chemicals in an organic solvent free medium.

The LAD separation was operated with PLS taken directly from mineral sand monazite leaching which may provide significant operational efficiency in a commercial setting.

A larger volume of PLS is now being prepared for scaled up test work and optimization, alongside the modelling for Dy and Tb separation.

Medallion has exclusively licensed the LAD Chromatography technology for all non-coal sourced raw materials. The Company is in discussion with third party companies regarding separation testing and are happy to receive expressions of interest from parties wishing to learn more.

#### Techno-Economic Assessment Update

Utilizing independent consultants, Medallion is presently finalizing a Techno-Economic Assessment (TEA) and Life Cycle Assessment (LCA) for the Medallion Monazite Process (see press release dated January 5 2021). These studies draw together Medallion's engineering, financial and environmental impact data and will become the foundation of Medallion's technology execution strategy.

Delivery of the TEA has unfortunately been impacted by COVID-19 staffing restrictions within consulting service providers. Final engineering materials have been recently received which are now being reviewed and independent financial modelling is now in progress.

#### About Medallion Resources

Medallion Resources (TSX-V: MDL; OTCQB: MLLOF; Frankfurt: MRDN) has developed a proprietary process and related business model to achieve low-cost, near-term, rare-earth element (REE) production by exploiting monazite. Monazite is a rare-earth phosphate mineral that is widely available as a by-product from mineral sand mining operations. Furthermore, Medallion has recently licensed an innovative REE separation technology from Purdue University which can be utilized by Medallion and sub-licensed by Medallion to third party REE producers.

REEs are critical inputs to electric and hybrid vehicles, electronics, imaging systems, wind turbines and strategic defense systems. Medallion is committed to following best practices and accepted international standards in all aspects of mineral transportation, processing, and the safe management of waste materials. Medallion utilizes Life Cycle Assessment methodology to support investment and process decision making.

More about Medallion can be found at [medallionresources.com](https://www.medallionresources.com).

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A photo accompanying this announcement is available at  
<https://www.globenewswire.com/NewsRoom/AttachmentNg/329f064b-c494-4fda-aded-7183bc277c57>

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Die URL für diesen Artikel lautet:

<https://www.rohstoff-welt.de/news/385306--Medallion-Updates-on-Success-of-Rare-Earth-Element-Separation-Technology-and-Status-of-Techno-Economic-a>

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