

19 June 2023

IONIC TECHNOLOGIES BEGINS RARE EARTH OXIDES PRODUCTION AT BELFAST RECYCLING FACILITY

- Production of recycled magnet Rare Earth Oxides (REOs) has started at Ionic Technologies Demonstration Plant in Belfast, UK;
- 4.2 kg of 99.7% grade of the light rare earth Neodymium Oxide (Nd_2O_3) produced;
- 0.6 kg of 99.8% grade of the heavy rare earth Dysprosium Oxide (Dy_2O_3) produced;
- Production milestone achieved in less than nine months after receiving UK Government support;
- Success supports further opportunities for commercialisation globally; and
- Ionic Technologies has “first mover” advantage in the recycling of separated magnet Rare Earth Oxides.

The Board of Ionic Rare Earths Limited (“IonicRE” or the “Company”) (ASX: IXR) advises that production of high purity, recycled magnet rare earth oxides (REOs) has begun at the Demonstration Plant at Ionic Technologies International Ltd (“Ionic Technologies”) Belfast facility in the UK.

“Our Belfast facility is key to us harnessing our technology to accelerate our mining, refining and recycling of magnets and heavy rare earths which are critical for the energy transition, advanced manufacturing, and defence,” Tim Harrison, Managing Director at IonicRE, said.

“The commercialisation of our recycling technology and our focus on the delivery of the Makuutu Heavy Rare Earths Project in Uganda positions us to provide a secure, sustainable, and traceable supply of magnet REOs.”

The Belfast facility is expected to receive a steady supply in magnets to be recycled from sources such as end-of-life turbines from grid scale wind farms and magnets and components from used electric vehicles and MRIs.

Mr Harrison commented further that *“market analysts forecast the current US\$3 billion global market for rare earth oxide magnets is expected to shortly be in deficit with estimates that the market would increase fivefold, to in excess of US\$15 billion, by the end of the decade, with significant demand growth in the EU, north Asia, and the US.”*

“To help fill this deficit, IonicRE wants to accelerate its mining, refining and recycling to align with global policy priorities and off-taker objectives in order to enter these markets.”

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“IonicRE are planning to progress the technology with the deployment of modular recycling initiatives in markets looking to develop domestic, secure, and sustainable supply chains to address strategic supply and sovereign security, placing Europe at the epicentre of rare earth element recycling”.



Figure 1: First separated magnet rare earth oxides produced from Ionic Technologies’ Belfast Recycling Demonstration Plant, showing >99.5% Neodymium oxide (Nd_2O_3) on left, and Didymium oxide (NdPr oxide) on right.

The products produced to date in Belfast during process commissioning include a selection of products which the Company has been targeted based upon potential supply chain partner requirements, including;

- 4.2 kg of Nd_2O_3 grading 99.7%, and ~0.3% Dy_2O_3 (total REO content of 99.99%); and
- 0.6 kg of Dy_2O_3 grading 99.8 % (total REO content of 99.9%).

The Company will now utilise these products and additional near-term production of NdPr oxide (didymium oxide) to progress further on more engagement with potential supply chain collaboration partnerships to explore commercial opportunities.

About the production of REOs at Ionic Technology:

Ionic Technologies is a 100% owned subsidiary based in Belfast UK, which the Company acquired in H1 2022. Ionic Technologies has developed rare earth element separation and refining technology and applied this to the recycling of spent permanent Neodymium-Iron-Boron (NdFeB) magnets.

The process uses a hydrometallurgical process to extract the rare earth elements (REE), then separate the individual magnet REEs within – Neodymium (Nd), Praseodymium (Pr), Dysprosium (Dy) and Terbium (Tb) – and finally refine to high purity individual magnet rare earths oxides (REO).



Figure 2: Calcination of Nd_2O_3 on left, and Dy_2O_3 oxide on right.

In September 2022, IonicTech was awarded a grant of £1.72 million (approximately A\$2.9 million) from the UK Government's Innovate UK Automotive Transformation Fund Scale-up Readiness Validation (SuRV) program. This is a significant step towards securing the UK supply of critical rare earth metals for EV manufacture.

The magnet recycling Demonstration Plant will provide the data for the development of commercial facilities.

Ionic Technologies has an inventory of feedstock to support the Demonstration Plant trials, which currently sits at in excess of 50 tonnes of NdFeB permanent magnets and swarf material.

The Ionic Technologies magnet recycling process is agnostic on magnet quality, can process oxidised magnets, and can also manage coatings and films, to produce individually separated and refined high purity REOs.

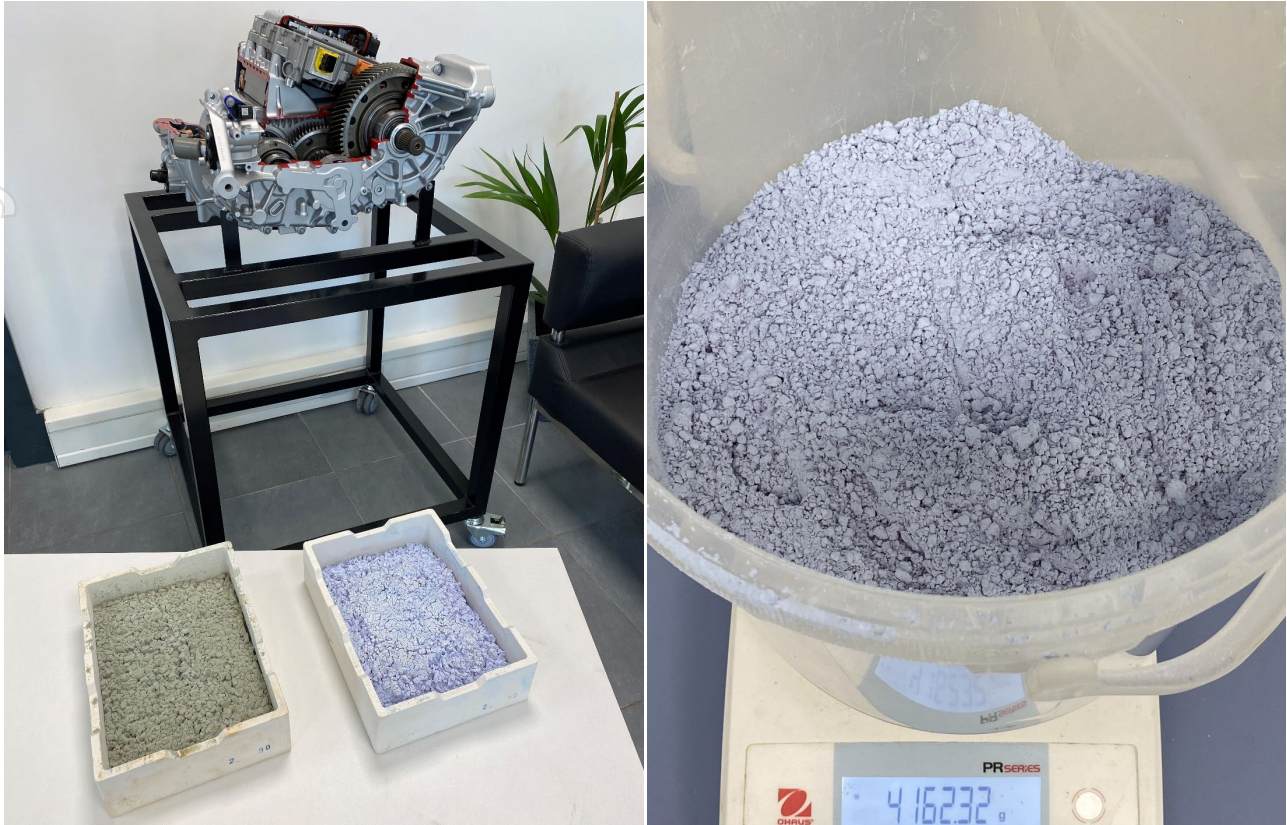


Figure 3: Left, image shows first NdPr oxide and Nd₂O₃ product laid out in Ionic Technologies showroom in front of a permanent magnet synchronous motor (PMSM), and right, >99.5% grade Nd₂O₃ product on right.

Technology Overview

Since its founding in 2015, as a spinout from Queens University Belfast (QUB), Ionic Technologies has developed processes for the separation and recovery of REEs from mining ore concentrates and waste permanent magnets.

The technology developed is a step up in efficient, non-hazardous, and economically viable processing with minimal environmental footprint.

Ionic Technologies has demonstrated capability for REEs to achieve near complete extraction of REO's from lower quality spent magnets and waste (swarf) to a recovery of high value magnet REO product quality exceeding 99.9% REO.

Ionic Technologies now has “first mover” advantage in the industrial elemental extraction of separated REOs from spent magnets and waste, enabling near term magnet REO production capability to satisfy growing demand from the energy transition, advanced manufacturing, and defence.

Ionic Technologies proprietary technology provides a universal method for the recovery of high purity grade rare earth elements from lower quality and variable grade magnets, to be used in the manufacture of modern high-performance and high specification permanent magnets required to support substantial growth in both electric vehicle (EV) and wind turbine deployment.

Our Path to Commercialisation

Rapid acceleration of our technology ready to scale globally

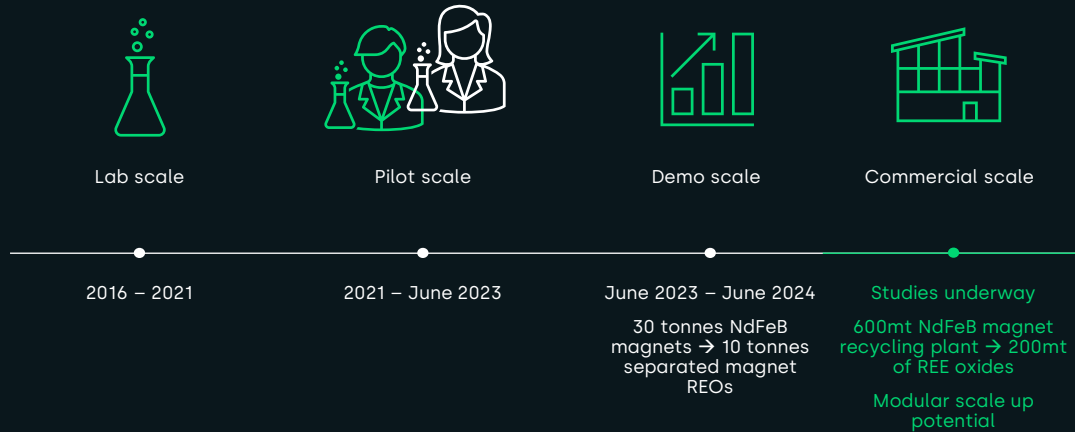


Figure 4: Ionic Technologies path to production.

About Ionic Technologies

Ionic Technologies has developed separation and refining technology that can be applied to the recycling and refining of individual magnet rare earths from used permanent (NdFeB) magnets.

Our hydrometallurgical process is able to deliver high purity separated magnet rare earth oxides no matter the quality and variability in composition of magnet feedstock.

Ionic Technologies is 100% owned by Australian rare earth resources company [Ionic Rare Earths Limited](#) (ASX: IXR).

Intake flexibility

Unlike other recycling processes, our technology can recycle any form of mixed waste magnets and production swarf regardless of type, age or coatings. We are not reliant on a single feedstock stream.

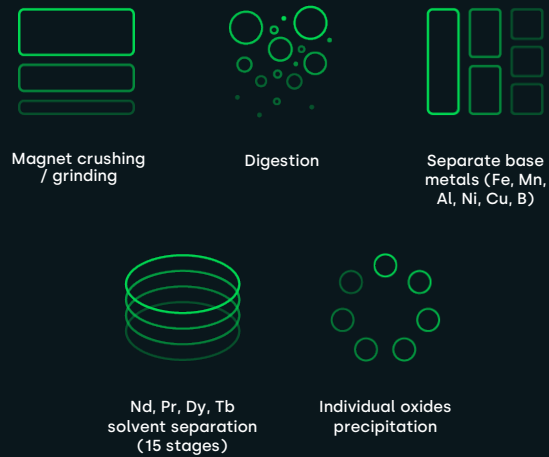


Figure 5: Ionic Technologies technology overview.

Authorised for release by the Board of Ionic Rare Earths Limited.

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About Ionic Rare Earths Ltd

Ionic Rare Earths Limited (ASX: IXR or IonicRE) is set to become a miner, refiner and recycler of sustainable and traceable magnet and heavy rare earths needed to develop net-zero carbon technologies.

The flagship Makuutu Rare Earths Project in Uganda, 60% owned by IonicRE, is well-supported by existing tier-one infrastructure and is on track to become a long-life, low Capex, scalable and sustainable supplier of high-value magnet and heavy rare earths oxides (REO). In March 2023, IonicRE announced a positive Stage 1 Definitive Feasibility Study (DFS) for the first of six (6) tenements to progress to a Mining Licence Application (MLA) which is pending in Uganda. The Makuutu Stage 1 DFS defined a 35-year life initial project producing a 71% rich magnet and heavy rare earth carbonate (MREC) product basket and the potential for significant potential and scale up through additional tenements.

Ionic Technologies International Limited ("IonicTech"), a 100% owned UK subsidiary acquired in 2022, has developed processes for the separation and recovery of rare earth elements (REE) from mining ore concentrates and recycled permanent magnets. Post-acquisition, IonicTech is focusing on the commercialisation of the technology to achieve near complete extraction from end of life / spent magnets and waste (swarf) to high value, separated and traceable magnet rare earth products with grades exceeding 99.9% rare earth oxide (REO). This technology provides first mover advantage in the industrial elemental extraction of REEs from recycling, enabling near term magnet REO production capability to support demand for early-stage alternative supply chains.

As part of an integrated strategy to create downstream supply chain value, IonicRE is also evaluating the development of its own magnet and heavy rare earth refinery, or hub, to separate the unique and high value magnet and heavy rare earths dominant Makuutu basket into the full spectrum of REOs plus scandium.

This three-pillar strategy completes the circular economy of sustainable and traceable magnet and heavy rare earth products needed to supply applications critical to electric vehicles, offshore wind turbines, communication, and key defence initiatives.

IonicRE is a Participant of the UN Global Compact and adheres to its principles-based approach to responsible business.

Competent Persons Statement

The information in this report that relates to Ore Reserves for the Makuutu Rare Earths deposit was first released to the ASX on 20 March 2023 and is available to view on www.asx.com.au. Ionic Rare Earths Limited confirms that it is not aware of any new information or data that materially affects information included in the relevant market announcement, and that all material assumptions and technical parameters underpinning the estimates in the announcement continue to apply and have not materially changed.

The information in this report that relates to Production Targets or forecast financial information derived from production the production target for the Makuutu Rare Earths deposit was first released to the ASX on 20 March 2023 and is available to view on www.asx.com.au. Ionic Rare Earths Limited confirms that all material assumptions and technical parameters underpinning the Production Targets or forecast financial estimates in the announcement continue to apply and have not materially changed.

Forward Looking Statements

This announcement has been prepared by Ionic Rare Earths Limited and may include forward-looking statements. Forward-looking statements are only predictions and are subject to risks, uncertainties and assumptions which are outside the control of Ionic Rare Earths Limited. Actual values, results or events may be materially different to those expressed or implied in this document. Given these uncertainties, recipients are cautioned not to place reliance on forward looking statements. Any forward-looking statements in this document speak only at the date of issue of this document. Subject to any continuing obligations under applicable law and the ASX Listing Rules, Ionic Rare Earths Limited does not undertake any obligation to update or revise any information or any of the forward-looking statements in this document or any changes in events, conditions, or circumstances on which any such forward looking statement is based.