

ANSTO commences Metallurgical Test Work for the Caldeira REE Project

Highlights

- **Metallurgical test work on the Caldeira Project commenced** at the Australian Nuclear Science and Technology Organisation (ANSTO)
- This program advances work undertaken by JOGMEC via the SGS/Geosol Laboratory in Belo Horizonte, Brazil, on representative samples from Capão do Mel (2016 – 2019) and previously reported (ASX announcement 20th of December 2022)
- **ANSTO are engaged to progress metallurgical test work aimed at optimising** previous leach recoveries, impurity removal and REE precipitation tests
- **Historical work highlighted optimal REE recovery in less than 10 minutes using ammonium sulphate solution**
- Studies demonstrate the REE are adsorbed onto clays, classifying the resource as a true Rare Earth Ionic Clay Deposit amenable to rapid ammonium sulphate leaching at pH 4, under atmospheric temperature and pressure

Meteoric Resources NL (ASX: MEI) ('Meteoric' or 'the Company') is pleased to provide an update on the status of the metallurgical test work being carried out on its 100%-owned Caldeira Rare Earth Ionic Clay Project, in the state of Minas Gerais, Brazil.

Meteoric has engaged the world renowned Australian Nuclear Science and Technology Organisation (ANSTO) to assist with process flowsheet development and build on historical test work that produced outstanding results utilising representative ore samples from the Capão do Mel Deposit.

Commenting on the commencement of the ANSTO program, Meteoric Chief Executive Officer, Nick Hothouse said,

"We are very pleased to see this important work underway. We know that the historical work completed at the Caldeira Project prior to its acquisition by Meteoric, showed outstanding results and clearly demonstrated that the REE mineralisation is an Ionic Clay with its superb response to ammonium sulphate leaching at pH 4. Those initial results achieved by JOGMEC have given us a solid start and now the work continues to further optimise recoveries and advance the development of the process flowsheet. We are delighted to have ANSTO onboard as a Technical Partner as we take the Caldeira Project forward."

Historical JOGMEC Metallurgical Results

As reported in the ASX announcement on the 20th of December 2022, the JOGMEC test work strongly supports that REE mineralisation at the Caldeira Project is an Ionic (Adsorption) Clay Deposit. The metallurgical bulk sample composited by JOGMEC was compiled from a selection of 184 samples, taken from 41 holes across the Capo de Mel license area. The optimum variables summarised from the test work were as follows:

- Concentration of ammonium sulphate (NH₄)₂SO₄ leaching agent was between 2-4%
- Liquid to solid ratios were between 4-5
- Addition rates of (NH₄)₂SO₄ was 160kg/t
- Rare earth leach extractions occurred in less than 10 minutes
- Average recovery to final carbonate product of Nd₂O₃ and Pr₆O₁₁ was 58%
- Average recovery to final carbonate product of Dy₂O₃ and Tb₄O₇ was 43%

SGS test work results for overall rare earth recoveries to a final rare earth carbonate are shown below (**Table 1**). It should be noted that the recoveries reported below are as yet non-optimised and there remains considerable potential for improvement over the course of the test work program.

Table 1. Caldeira REE historical overall recoveries to carbonate

REO	Sample 1	Sample 2	Sample 3	Sample 4	Average
La ₂ O ₃	61%	62%	59%	64%	62%
Ce ₂ O ₃	4%	4%	4%	4%	4%
Pr ₆ O ₁₁	53%	51%	49%	54%	52%
Nd ₂ O ₃	65%	63%	61%	67%	64%
Sm ₂ O ₃	53%	52%	48%	53%	52%
Eu ₂ O ₃	55%	53%	52%	56%	54%
Gd ₂ O ₃	56%	57%	53%	57%	56%
Tb ₄ O ₇	50%	47%	42%	48%	47%
Dy ₂ O ₃	41%	38%	35%	40%	39%
Ho ₂ O ₃	33%	28%	15%	29%	26%
Er ₂ O ₃	28%	29%	31%	29%	29%
Tm ₂ O ₃	26%	25%	22%	25%	25%
Yb ₂ O ₃	15%	19%	17%	19%	18%
Lu ₂ O ₃	21%	21%	19%	22%	21%
Y ₂ O ₃	37%	38%	35%	37%	37%

Next Steps

Meteoric's Diamond Drill program, currently underway, (originally designed as 21 holes) has now been significantly expanded. The drilling is planned to test the depth of REE mineralisation and to assess the metallurgical variability spatially across the resource and additionally, assess vertical zonation in element distribution of the Light REE and Heavy REE components. The Diamond Drill cores will be split into two portions with half going for assay and half for metallurgical test work at ANSTO.

To understand the metallurgical variability, samples have been selected across the Capo do Mel, Soberbo, Figueira, Cupim Verhmelo Norte, and Dona Maria 1 & 2 Prospects.

However, core samples from Capo do Mel and Soberbo only will be shipped in early July to ANSTO as a priority and the flowsheet advanced around these zones as a priority as they represent the high-grade starter pit areas and the feed source for the first decade or so of processing.

Metallurgical variability tests will commence on individual diamond holes from these prospects initially formed from 3m composite intervals. Following results of the interval testing, a bulk master composite for each prospect will undergo detailed testing as outlined in the Scope of Work below.

Metallurgical Test Work Scope

Leaching Program

The first phase of leach tests have been designed to confirm results from previous JOGMEC test work and to determine the most feasible approach for rare earth extraction. The test work will look to evaluate metallurgical variability and further optimise leaching conditions including pH, temperature, residence time, % solids, lixiviant type and concentration. In addition, the leaching tests will give an early insight into solid liquid separation performance.

Impurity Removal

Following the leaching program, impurity removal tests will be performed to optimise the rejection of deleterious elements such as aluminium, iron, silica, calcium, thorium and uranium whilst maximising the recovery of the rare earths. The test work will look to evaluate impurity removal conditions including pH, alkali type, temperature, residence time, % solids and solid-liquid separation performance.

Rare Earth Precipitation

Following the impurity removal program, rare earth precipitation tests will be performed to generate a saleable rare earth product. The test work will evaluate the type of precipitation agent, pH, temperature, residence time, % solids and solid liquid separation performance.

Schedule

The Metallurgical Scope of Work is comprehensive and will run for approximately nine months to enable adequate characterisation of each of the prospects. As milestone results come to hand, they will be reported to the market with initial diagnostic leach results for Capo do Mel and Soberbo to be available in Q4 2023.

About ANSTO

ANSTO have extensive experience in rare earth process development with several rare earth experts in their team having ~ 30 years of experience dating back to early work on the Mt Weld deposit (monazite mineralogy) in the early 1990s. Over the last 10 to 15 years, they have worked on numerous rare earth projects both in terms of process development, piloting (Peak Resources, Arafura Resources, ASM, Northern Minerals, Hastings Technology Metals, Mkango Resources, Iluka Resources) and providing expert advice.

Over the last 5 years, ANSTO expertise has shifted to an increasing number of ionic adsorption and clay hosted REE projects (>15 currently in progress), including the more advanced projects of Aclara (Chile), Serra Verde (Brazil) and Ionic Rare Earths (Uganda) and Australian Rare Earths (South Australia). Work on these projects has included leaching/desorption, solid/liquid separation, impurity removal and rare earth precipitation, mineralogy, radionuclide deportment and removal, process modelling and mini-plant circuit operations.

Background Information on Ionic Clay REE Deposits

Geologically, the Caldeira REE Project is classified as an Ionic Adsorption Clay REE Deposit, which is characterised by the following key criteria:

- Formed in the saprolite (clay) zone of the weathering profile
- Majority of REE's **adsorbed** onto clay minerals and accumulate in the soil or clay zone of the regolith profile
- Adsorbed REE are ionically attached to the clay minerals and can be liberated by washing in a weak solution of ammonium sulphate (or other metal salt) at near neutral pH
- Ionic Adsorption Clay REE Deposits are typically found near the surface, often at depths of less than 10 meters.
- The U and Th levels in Ionic Clay REE Deposits are typically low to very low, as these elements are less soluble in hydrothermal fluids and are not preferentially adsorbed by clays during the weathering and leaching process

This release has been approved by the Board of Meteoric Resources NL.

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Mineral Resource Statement – Caldeira Project (ASX:MEI 1/5/2023)

Table 2. Caldeira REE Project 2023 Mineral Resource Estimate– by licence at 1,000ppm TREO cut-off

Licence	JORC Category	Tonnes Mt	TREO ppm	Pr ₆ O ₁₁ ppm	Nd ₂ O ₃ ppm	Tb ₄ O ₇ ppm	Dy ₂ O ₃ ppm	MREO ppm	MREO/TREO %
Capão do Mel	Inferred	68	2,692	148	399	4	22	572	21.3%
Cupim Vermelho Notre	Inferred	104	2,485	152	472	5	26	655	26.4%
Dona Maria 1 & 2	Inferred	94	2,320	135	404	5	25	569	24.5%
Figueira	Inferred	50	2,811	135	377	5	26	542	19.3%
Soberbo	Inferred	92	2,948	190	537	6	27	759	25.8%
Total	Inferred	409	2,626	154	447	5	25	631	24.0%

TREO = La₂O₃ + CeO₂ + Pr₆O₁₁ + Nd₂O₃ + Sm₂O₃ + Eu₂O₃ + Gd₂O₃ + Tb₄O₇ + Dy₂O₃ + Ho₂O₃ + Er₂O₃ + Tm₂O₃ + Yb₂O₃ + Lu₂O₃ + Y₂O₃