Sustainable Enhanced Rock Weathering (ERW) with High-Performance Pyroxenite

A Next-Generation Carbon Removal Mineral Solution

INTRODUCTION & STRATEGIC ADVANTAGE

Who We Are?

Orex Mining Company FZCO, established in 2014 as a Free Zone entity in the UAE, operates integrated mining and mineral supply operations across multiple jurisdictions. Our portfolio spans mining, trading, shipping, and logistics, ensuring reliable bulk supply capabilities for global markets.

We are proud to introduce our **UAE-based Pyroxenite mining facility**, positioned to supply high-quality material specifically optimized for **Enhanced Rock Weathering (ERW)** applications.

The Shift in ERW Minerals

Traditionally, ERW projects have relied on:

- Basalt
- Wollastonite
- Olivine

While effective, these materials present limitations in:

- Reactivity rates
- Carbon sequestration efficiency
- Logistics and grinding energy intensity
- Cost per ton of CO_2 removed

Pyroxenite offers a superior alternative.

Why Pyroxenite?

Pyroxenite is an ultramafic rock rich in calcium and magnesium silicates, ideal for rapid atmospheric CO_2 mineralization.

Key Advantages Over Basalt

✓ Higher MgO and reactive silicate content
✓ Faster weathering kinetics
✓ Higher theoretical CO_2 capture per ton
✓ Lower impurity variability
✓ Reduced land application volume per ton CO_2 removed

Advantage Over Wollastonite

✓ More abundant and scalable
✓ Lower extraction cost
✓ Stronger long-term mineral stability
✓ Better supply security for gigaton-scale deployment

OREX

TYPICAL ANALYSIS REPORT

Rak Lab
RAK Lab L.L.C.
Independent Testing Laboratory

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مختبر فحص مستقل

REPORT ON ANALYSIS OF MATERIALS

Customer	: **OREX MINING COMPANY DMCC**		
Address	: P.O. Box 336601, UNIT 905, HDS BUSINESS CENTER, Plot No: JLT-PH1-M1A M Cluster, JLT, Dubai, United Arab Emirates		
Contractor	: Not Applicable	Consultant	: Not Applicable
Project number	: Not Applicable	Client	: Not Applicable
Project name	: Quality Asurance	Project location	: Not Applicable
Report number	: RP-521041-26	Report date	: 23/01/2026
Job order number	: JO-326-15	Date sample received	: 16/01/2026
Sample number	: SA-340240-26	Time sample received	: 12:00 Hrs
Sampling ref. #	: Not Applicable	Sampling location	: Not Given
Sampling procedure ref.	: Not Given	Sampled by	: Customer representative
Sampling condition	: Not Given	Sample brought in by	: Customer representative
Sampling date & time	: Not Given	Sampling method variation	: Not Given
Sample description	: Crushed rock	Senders ref. #	: **Pyroxenite Rock**
Sample size	: 2 kg (Approximate)	Condition of sample	: Dry
Source of sample	: Not Given		

Test Data

Date test started	: 16/01/2026	Date test completed	: 23/01/2026
Tested by	: SK		

PARAMETERS		UNITS	RESULTS (BY WEIGHT OF DRY SAMPLE)
Heavy Metals			
Antimony	(Sb)	ppm	3.47
Arsenic	(As)	ppm	<0.01
Cadmium	(Cd)	ppm	4.0
Chromium	(Cr)	ppm	229
Cobalt	(Co)	ppm	65.4
Lead	(Pb)	ppm	1.37
Molybdenum	(Mo)	ppm	<0.01
Nickel	(Ni)	ppm	18.86
Selenium	(Se)	ppm	<0.01
Vanadium	(V)	ppm	10.0
Mercury	(Hg)	ppm	<0.01

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هـ : ٨٣٤١ ٢٦٦ ٧ ٩٧١+ ، ف : ٨٢٩٢ ٢٦٦ ٧ ٩٧١+
البريد الإلكتروني: www.raklab.com/info@raklab.com

REPORT ON CHEMICAL ANALYSIS OF ROCK

Customer	: **OREX MINING COMPANY DMCC**		
Address	: P.O. Box 336601, UNIT 905, HDS BUSINESS CENTER, Plot No: JLT-PH1-M1A M Cluster, JLT, Dubai, United Arab Emirates		
Contractor	: Not Applicable	Consultant	: Not Applicable
Project number	: Not Applicable	Client	: Not Applicable
Project name	: Quality Assurance	Project location	: Not Applicable
Report number	: RP-394748-22	Report date	: 11/05/2022
Job order number	: JO-326-15	Date sample received	: 07/05/2022
Sample number	: SA-250977-22	Time sample received	: 08:00 Hrs
Sampling ref. #	: Not Applicable	Sampling location	: Not Given
Sampling procedure ref.	: Not Given	Sampled by	: Not Given
Sampling condition	: Not Given	Sample brought in by	: Customer representative
Sampling date & time	: Not Given	Sampling method variation	: Not Applicable
Sample description	: Crushed Rock (Pyroxenite)	Senders ref. #	: **Email Dated : 06/05/2022, Pyroxenite**
Sample size	: 15 kg (Approximate)		
Source of sample	: Not Given	Condition of sample	: Dry

Test Data

Date test started	: 07/05/2022	Date test completed	: 10/05/2022
Tested by	: MD		

PARAMETERS		RESULTS (% BY WEIGHT OF DRY SAMPLE)
Magnesium Oxide	(MgO)	38.50
Silica	(SiO_2)	39.52
Aluminum Oxide	(Al_2O_3)	0.33
Sodium Oxide	(Na_2O)	0.12
Potassium Oxide	(K_2O)	< 0.01

Test method : 1. Manual of procedures for Chemical and Instrumental analysis of Ores, Minerals and Ore dressing products - Indian bureau of mines.
2. ASTM C 1301-2009
3. ASTM C 25-11

TECHNICAL & ECONOMIC BENEFITS

1. Superior Carbon Capture Potential

Pyroxenite reacts with atmospheric CO_2 through natural weathering processes:

Silicate minerals + CO_2 + Water → Stable Carbonates + Dissolved Bicarbonate

This reaction:

- Permanently removes CO_2
- Improves soil alkalinity
- Releases beneficial nutrients (Mg, Ca)

Higher CO_2 Sequestration Efficiency

Compared to standard basalt:

- Greater reactive Mg-silicate concentration
- Higher CO_2 capture per ton of rock
- Reduced grinding requirement for similar reactivity

Result: **Lower cost per ton of CO_2 removed.**

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2. Economic Efficiency

ERW project economics depend on:

1.Mining cost 2. Crushing & grinding cost 3. Transport cost

4.Application rate per hectare 5. Carbon credit value

Pyroxenite Improves All Five

✓ Higher CO_2 removal per ton → lower material requirement
✓ Competitive mining costs from UAE operation
✓ Bulk shipping advantages via integrated logistics
✓ Lower cost per verified carbon credit
✓ Strong scalability potential

Orex Mining integrates mining + trading + logistics to provide: **Stable long-term supply contracts for ERW developers.**

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3. Soil & Agronomic Benefits

Beyond carbon removal, pyroxenite contributes to:

- Soil pH buffering
- Magnesium enrichment
- Trace mineral supplementation
- Potential yield improvements in acidic soils

This creates a dual value model: **Carbon Credits + Agricultural Productivity**

Key Aspects of Pyroxenite in Agriculture

•Nutrient Source: Pyroxenite is rich in magnesium- and iron-rich minerals. It is used to enhance soil nutrient profiles, particularly in tropical, acid, and nutrient-depleted soils.

•Slow-Release Fertilizer: As a silicate rock, it acts as a slow-release fertilizer, which can help reduce nutrient runoff compared to conventional, fast-acting chemical fertilizers.

•Specific Applications: Research indicates that the fine fraction of weathered pyroxenite, particularly when associated with phosphate, can serve as a valuable, inexpensive fertilizer for crops.

•Soil Amendment: Due to its magnesium content, it is considered a suitable amendment for magnesium-deficient soils, acting similarly to other magnesium silicates.

CARBON CREDITS, ESG & GLOBAL IMPACT

Carbon Credit Potential

Enhanced Rock Weathering is recognized as a durable carbon removal pathway.

Using pyroxenite can:

- Increase CO_2 removal efficiency per hectare
- Improve verification metrics (due to higher Mg reactivity)
- Lower cost of Measurement, Reporting & Verification (MRV) per ton

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Why Partner with Orex Mining?

✓ UAE strategic location for global export
✓ Established mining and logistics expertise
✓ Consistent mineral quality control
✓ Long-term commercial reliability and ability to support pilot to gigaton-scale projects

Contact Us:

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*** Sustainable Minerals for a Net Zero CO_2 Future.