

nexa

#FUTUREOFMINING

**Innovation**

**Creating value through circular economy**

**nexa**

# Summary

Nexa

Vazante and Morro Agudo

Três Marias

Juiz de Fora

Cerro Lindo

Pasco

Cajamarquilla



# We are nexa

Among the major 5 **Zinc** global player



**Lead and Copper** producer



We sell to **all continents**



Stocks listed on **NYSE, TSX** and **(BVL)** since 2017



More than **13.000** employees and contractors



Operations and projects in **Brazil, Peru** and **Namibia**



More than **70 years of operating experience** in mining and metallurgy



# PROJECTS AND OPERATIONS



## Mining

**Vazante**  
(Brazil)

**Morro Agudo**  
(Brazil)

**Aripuanã**  
(Brazil)

**Cerro Lindo**  
(Peru)

**El Porvenir**  
(Peru)

**Atacocha**  
(Peru)



## Smelter

**Três Marias**  
(Brasil)

**Juiz de Fora**  
(Brasil)

**Cajamarquilla**  
(Peru)



## Mineral Exploration

**Brasil**  
**Peru**  
**Namíbia**



## Offices

**Luxembourg**

**Brazil – Belo Horizonte**

**Brazil – São Paulo**

**Peru – Lima**

**USA – Houston**

We have a **ESG** based strategy

JEITO  
nexa



nexa

# Recognitions and prizes



1st place Brasil Mineral **Inovação** man of the year for **Rodrigo Gomes**



100 Open startups 2020, 2021

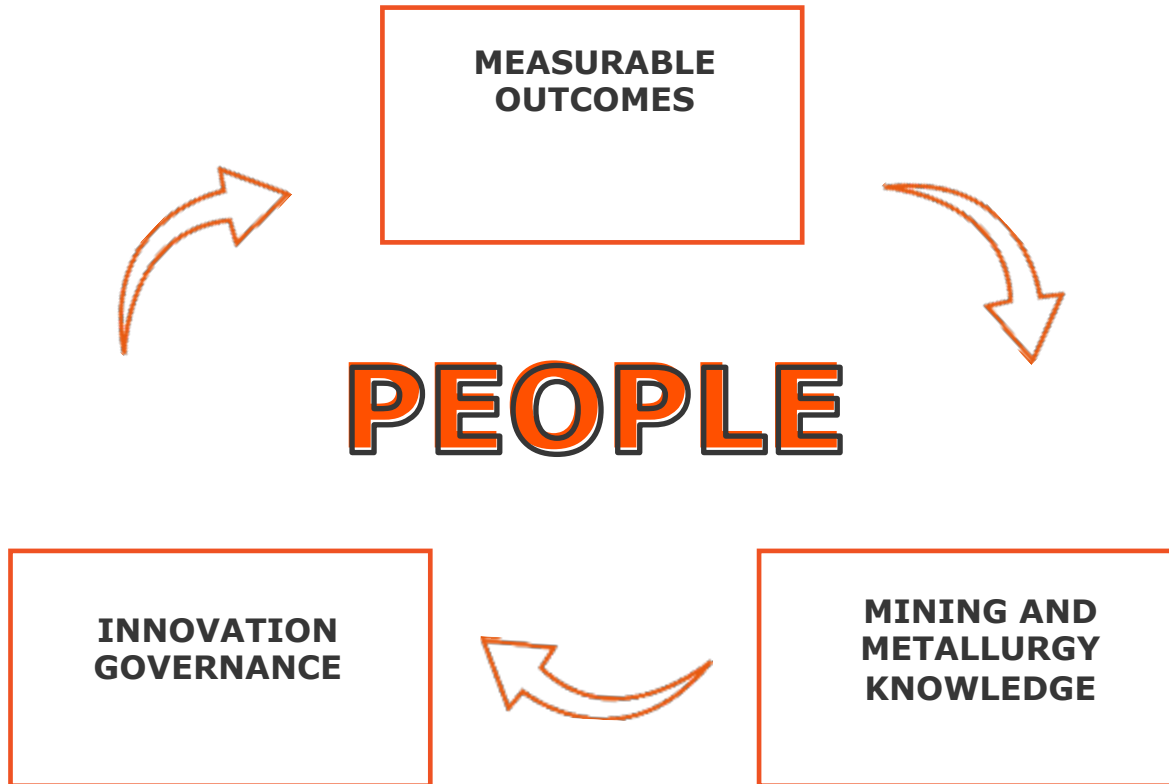


Top 3 Prêmio **Nacional de Inovação 2021/2022 e 2013/2014** Innovation management



Top 5 Prêmio **Valor Inovação Brasil 2019, 2020, 2021** mining and smelting

# INNOVATION STRATEGY



The people detain the knowledge, collaborate and have courage to innovate. This is our strength.

# FOCUS ON THE PEOPLE





We do

OPEN

INNOVATION



UNIVERSITIES



PUBLIC INSTITUTIONS



PELO FUTURO DA INOVAÇÃO



PELO FUTURO DA INDÚSTRIA

GOVERNMENTAL ENTITIES



STARTUP ACCELERATORS AND PLATFORMS



ENTREPRENEURIAL AND SECTORIAL ASSOCIATIONS



INTERNATIONAL TRADE AGENCIES



NON-FOR-PROFIT INSTITUTIONS

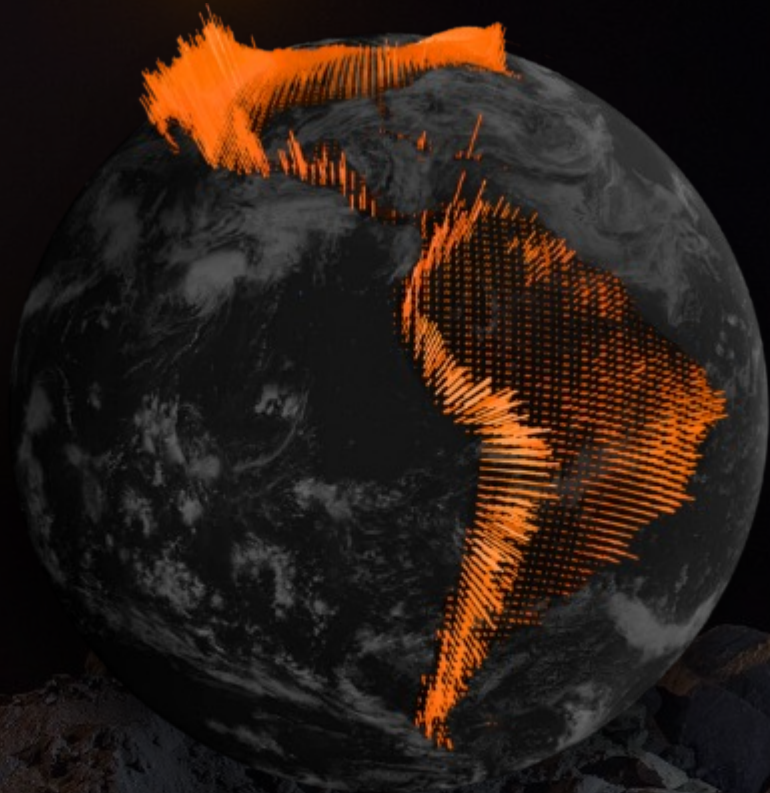


INNOVATION HUBS



OTHER PARTNERS





**nexa**



MINING  
**LAB**





# Mining Lab

**7** years  
**+1300** Initiatives evaluated  
**+40** deals  
+15 countries

[mininglab.com.br](http://mininglab.com.br)

# Circular Economy

**Multiple markets**



tailings →



processing →



Raw material



New products



Vidros



...



# TRÊS MARIAS

## TRÊS MARIAS

### UF pH9

60 kt/year

5 – 10% solids

### Characteristics:

CaSO4 – 49%

(NH4)Fe3(SO4)2(OH)6 – 14%

SiO2 – 12%

Fe2O3 – 7,5%

MgSO4 – 6,7%

ZnSO4 – 4,4%

Cd - 0,03%

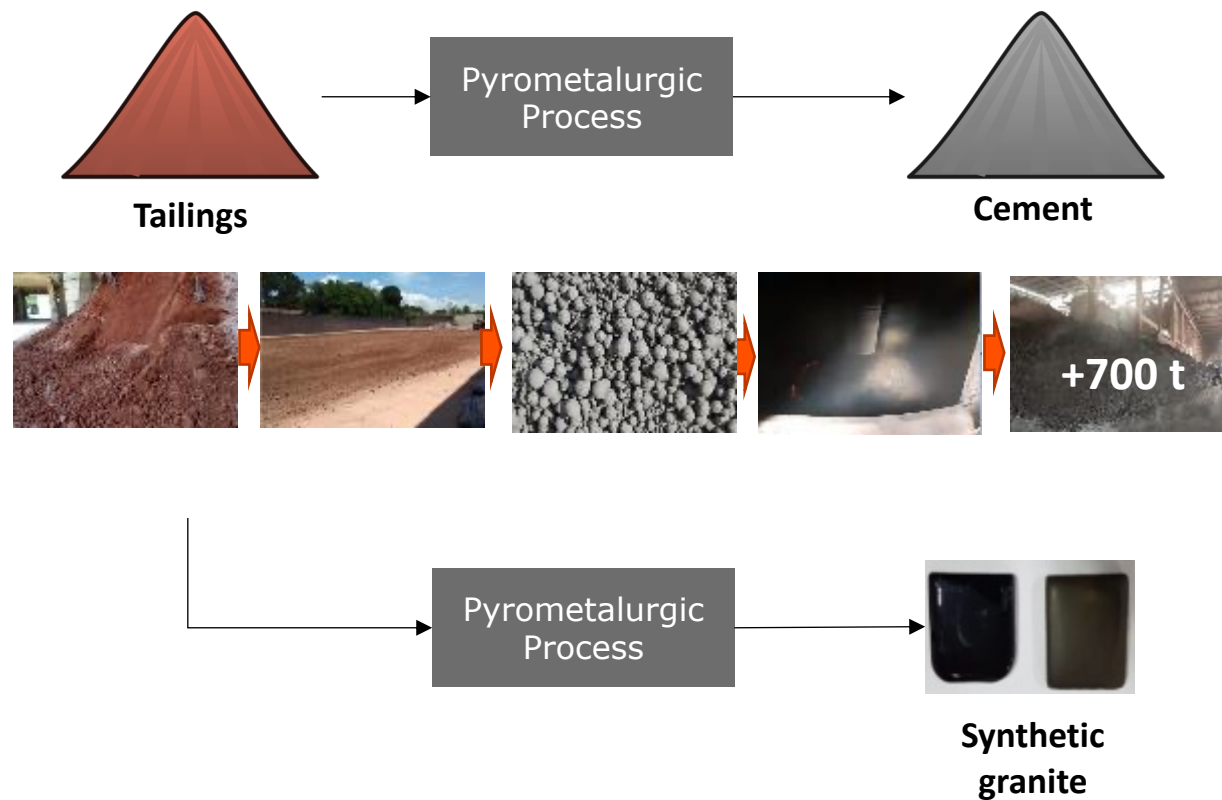
Pb – a 0,72 %

D50 – 14 µm

## Tailings



## Solutions



### Other solutions:

- Fertilizer

100% Potential to Recycle

# JUIZ DE FORA

## JUIZ DE FORA

### Jarosite

40 kt/year  
50% solids

### Characteristics:

$(\text{NH}_4)\text{Fe}_3(\text{SO}_4)_2(\text{OH})_6$  – 59%

$\text{CaSO}_4$  – 20%

$\text{ZnSO}_4$  – 7,4%

$\text{SiO}_2$  – 6,4%

$\text{PbSO}_4$  – 3%

$\text{MgSO}_4$  – 1,5

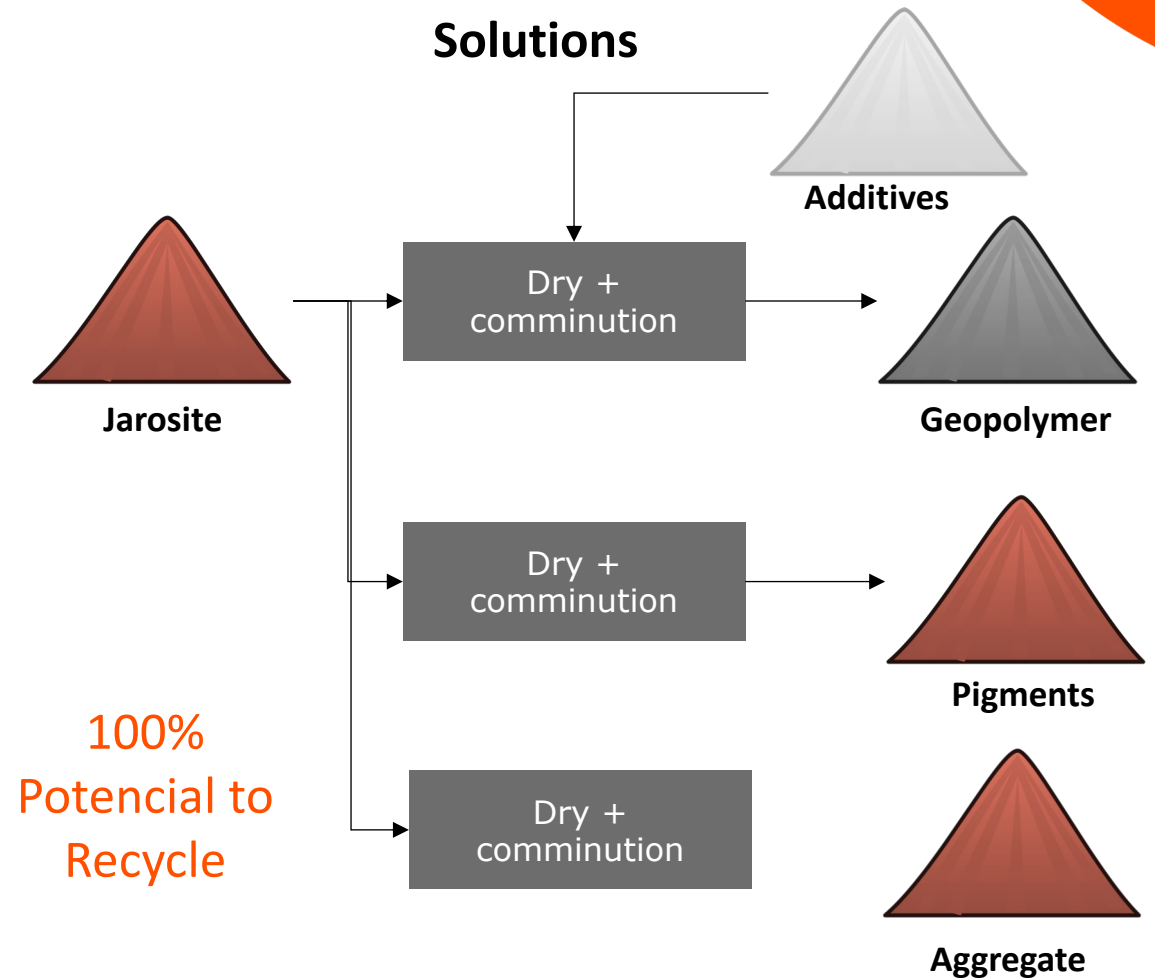
**Pb – 6300 ppm**

D50 – 16  $\mu\text{m}$

## Tailings



## Solutions



**100%  
Potential to  
Recycle**

### Other solutions:

- Fertilizer
- Concrete
- Synthetic granite
- Selective precipitation
- Calcination (metal recovery)

# CERRO LINDO

## CERRO LINDO

17 kt/day  
10% de H2O

### Characteristics:

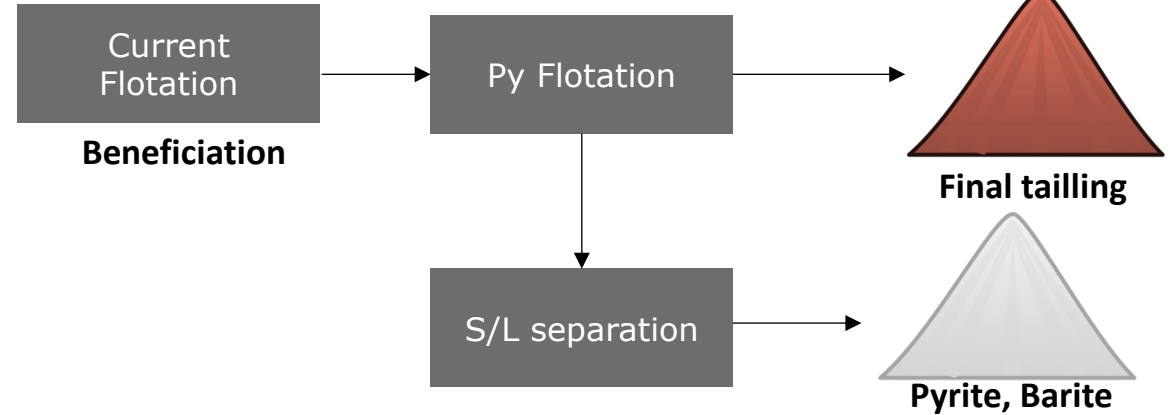
SiO<sub>2</sub>– 7%  
Barita–14%  
**FeS<sub>2</sub>–69%**  
Plagioclasa–7%  
KAlSi<sub>3</sub>O<sub>8</sub>–2%  
Muscovita–1%

D50 – 76 μm

## Tailings



## Solutions



## INSILICO (CHEMICAL COMPUTACIONAL)

At this level, some applications were identified, such as the following:



Semiconductors

Cations adsorption

Gas Adsorption

Catalizers

### Proof of concept of Pyrite application

Application to use as cations adsorbents as well as pollutants gases adsorption.



## Tailings

### EL PORVENIR

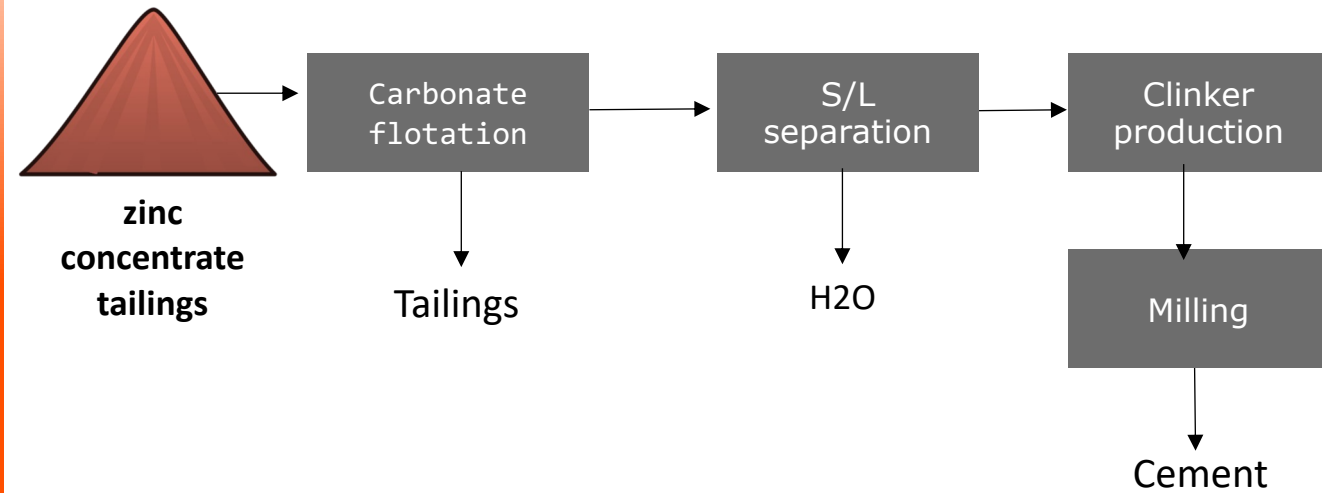
1980 kt/year  
70% solids

#### Characteristics:

SiO<sub>2</sub>–13%  
CaCO<sub>3</sub>–48%  
FeS<sub>2</sub>–8%  
Ca<sub>3</sub>Fe<sub>2</sub>(SiO<sub>4</sub>)<sub>3</sub>–3%  
KAlSi<sub>3</sub>O<sub>8</sub>–14%  
CaMg(CO<sub>3</sub>)<sub>2</sub>–7%



## Solutions



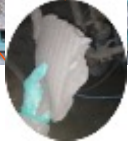
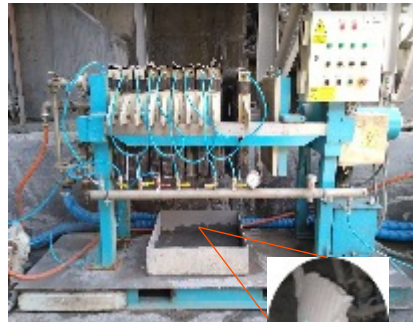
- Cement produced to employ in its operations (200kt/y)
- Reduction of 14% of tailing (increase dam useful life)

#### Other solutions:

- Lime production

## CARBONATE AND CEMENT PILOT PLANT)

### CARBONATE FLOTACIÓN AND FILTRATION



### PELLETIZING



Pellets  
<5,8mm>

### CALCINATION



Clinker  
LOI < 1.0%

### CLINKER & CEMENT PILOT PLANT

### MILLING



90%-m325



NEXA  
Cement

+ Yeso  
(5%)

# CAJAMARQUILLA

## Tailings

### Neutral sludge (UF pH9)

48 kt/year

8 – 12% solid

### Characteristics:

CaSO<sub>4</sub> – 88%

CaCO<sub>3</sub> – 6%

Zn – 4%

Cd – 800 ppm

Pb – 200 ppm

D50 – 17 μm



Figure 1. Historical Gypsum Tailings Pond at Nexa, Cajamarquilla (Top) and sampling of the top one meter done by Nexa in March 2022 (bottom).

## Solutions



### Solutions:

- Drywall
- Cement production

### Other solutions in evaluation MLB:

Fertilizer, Plastic wood, ceramic materials, walls.

### Challenge:

- 1) Solid/liquid separation > 95% Solid
- 2) Metals contents



**Gracias!**

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