

Draslovka

MPS & Glycine Leaching technology

For more information
about cyanides please visit

www.cyanides.org

www.draslovka.com



The definition of the problem



“IEA estimates that in past decade, mines took in average 16 years to be build. To get needed supply of future metals by 2040, it would cost \$2 trillion”¹

„CRU predicted deficit of 4,7 mil MT of Copper by 2030. Trafigure predicted deficit of 10 mil MT.“²

“None of the future metals are scarce in Earth crust. What really is are units of metals which are high-grade and can be extracted easily. Industry have to get better in extracting lower grades and bringing it to the market affordably”³

1. – Matthieu Favas, The Economist
2. – Joanne C. Freeze, CEO, Candente Copper
3. – Huw McKay, Chief Economist, BHP

What are the roadblocks?

Even though mining has an IRREPLACEABLE role in the supply chains, it was seen as “unfashionable” industry for the last decade



Mining was heavily under invested in the last decade



Opening a mine is a very long process and takes 5-10 years



Mining did not bring a lot of innovations, which would lead to better ESG profile



Due to lack of sustainability innovations, mining is typically seen as “**Not in my back yard**” type of operation



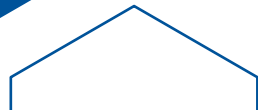
Lack of communication and education of the public



Importance of mining and its products is typically overrun by perspective of communities and NGO in mass media



Due to these factors, some institutional investors and lenders do not support mining companies



What would the solution look like?

Implementing the innovations that will lead to better ESG profile

- **Using more environmentally sustainable practices and chemicals**
- **Using less chemicals/reagents for one unit of processing**
- **Recover and recycle part of the chemicals/reagents**
- **Increase efficacy of the production**

As a result of that:

- Significant cost savings
- Improved environmental footprint
- Improved relationships with the communities, NGOs, investors, landers and other stakeholders enabling:
 - Better access to capital
 - Lower resistance at existing operations and when establishing new mining operations
 - Better ESG rating
 - Higher share price
- Increased efficacy and new practices will lead to increased lifetime of the mines that are already in operation resulting in:
 - Ability to economically process more complex/lower quality ores and tailings
 - Higher share price as a result of lower OPEX, higher recovery rate and new re-evaluation of deposits and/or value of metal in tailings

The background of the slide is a microscopic image of glycine crystals. The crystals appear as a dense, repeating pattern of fan-like or leaf-like structures, each with a central point and radiating, slightly curved segments. The overall color is a monochromatic blue, with varying shades of light and dark blue highlighting the intricate textures and patterns of the crystals.

**Draslovka have the solution to these
challenging problems.**

*Glycine crystals under the microscope

How could this solution help EV manufacturers?



Decreasing the ESG footprint of the whole EV industry

- Focus on the most problematic part of the supply chain process
- Introducing sustainability score for individual mining operations
- Procuring metal from operations with the highest score



First-mover advantage

- EV manufacturer to pro-actively support innovation in the mining industry
- EV manufacturer to enforces innovation and best practices in the mining industry to minimize the negative effects of mining on the environment and communities

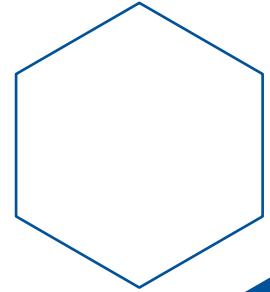


Strengthening of the supply lines

- Increasing efficacy of existing deposits (getting more metal per ton of ore)
- Unlock new metal from low-grade ores, flotation concentrate Flotation tailings (including retreatment of previously disposed of tailings), and smelter slags.
 - Taking over tailings
 - Process the tailings yourself
- Production process simplification in the upstream value chain



Enabling mining industry to keep pace with rapid development in batteries and EVs technology



Mining and Process Solutions

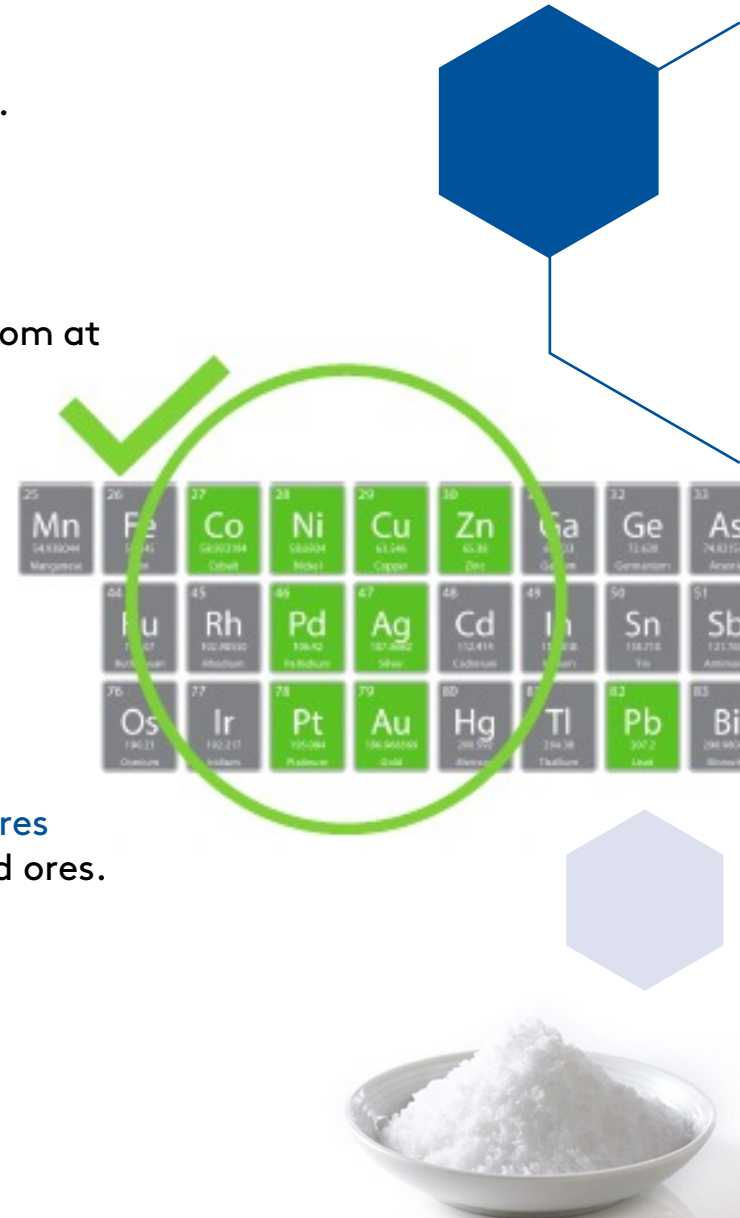


- MPS has a number of innovative processes being developed that are targeting metallurgical challenges in extraction of base and precious metals.
- MPS was founded in 2014 in Perth, Australia as a spin-of of Curtin university
- **Since 2015, MPS holds rights to commercialize Glycine Leaching Technology (GLT), in 2017 the exclusive, global and unencumbered commercialization rights were granted to the company.**
- **MPS protects its business through patents and prudent management of know how developed. All licenses are structured so any enhancements revert directly back to MPS.**
- In April 2022, the company was acquired by Draslovka and integrated into Mining Solutions business
- The integration into Draslovka Mining Solutions have following goals:
 - Accelerate market penetration of GlyCat™ technology
 - Expand management team (& independent board)
 - Advance development pipeline



What is Glycine?

- Glycine is a **non-toxic chemical** that is **fully bio-degradable**.
- It is used as a **food additive** for both humans and animals and have sugar-like appearance
- It generally is cheaper than cyanide and readily available from at least 20 different manufacturers.
- Is unique in its ability to **selectively leach both base and precious metals**.
- It is not chemically consumed so as a primary reagent **it is recoverable and recyclable** – providing a major advantage in costs.
- Acts synergistically with a range of additives: effective with starved levels of cyanide for **complex gold ores** (gold ore with elevated base metals), and free milling gold ores.



The gamechangers in metals mining

GlyCat™

Glycine + NaCN
Leaching of Gold

Utilizes glycine, a **non-toxic** food additive that is fully **bio-degradable** and **recyclable**

20-80% reduction in cyanide

Eliminates detoxification

Copper value realization

Easily adapted

Proprietary patented technology

GlyLeach™

Glycine

Leaching of **Copper, Nickel and Cobalt**
Sulfide

Alternative to acid

Higher heap leach recoveries and selective leaching

Low operating cost: glycine is recycled

Unlocking significant new production from previously unviable deposits

Proprietary patented technology

GlyCat™ Technology: Industry gamechanger

“The GlyCat™ process offers a simple and effective method to reduce cyanide consumption caused by the presence of copper in gold ores and concentrates. Reusable glycine is added to the leach to enable 50- 90% reduction in cyanide usage for similar gold extractions.”

Value in use:

- **>70% reduction in cyanide** for gold ores with elevated base metals or pyrites. \$4-5m saving for a typical 1 mtpa gold operation (or 25% reduction in processing costs).
- **20-50% reduction in cyanide** for most free milling gold ores. Typically a 10% reduction in total processing costs.
- **Copper value realisation** if present in economic quantities
- **Eliminates detoxification** where mandatory or required to comply with international cyanide management code standards. Typically 5-10% of total processing costs.
- **ESG benefits** in reducing use of chemicals
- **Easily adapted** to existing CIL/CIP plants without modification. Simply requires changeover to a new chemical blend
- **Enables opening of new mines** or already closed operations due to low rentability of mining
- **Instantly increasing value** of gold producing property
- **No capex** if glycine allowed to go to tailings dam. Low capex if glycine recycled
- **Low production implementation risk.** Easy to trial. Circuit can be restored back to cyanide easily if required

GlyCat™: The ESG benefits

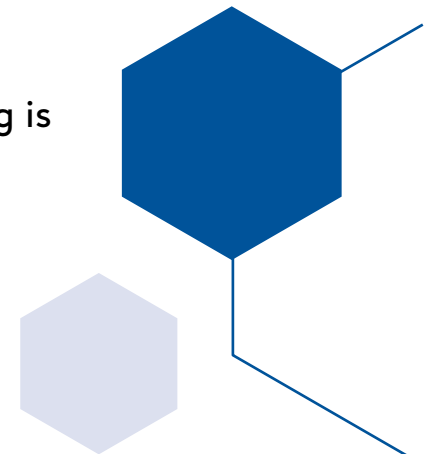
ESG challenges as defined by rating agencies

"We view containment and environmental safety of tailings and mine site rehabilitation, and **responsible use of cyanide in gold extraction processes**, as the company's most impactful environmental management issues."

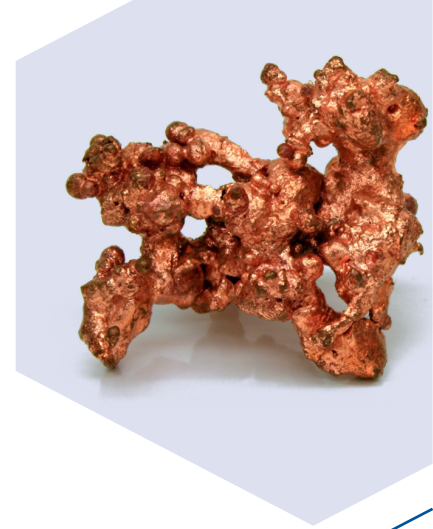
S&P ESG Report Card, AngloGold Ashanti

ESG benefits of the GlyCat™ technology

- Higher efficiency, less chemicals used in the leaching process
- Glycine is not chemically consumed so can be recycled.
- Reduced or eliminated detoxification costs as free cyanide is reduced to very low levels, often not detected. In many mining jurisdictions such low levels will not require detoxification of tailings.
- Leaching with GlyCat™ is typically at ambient temperature, so no heating is required.



GlyLeach™ Technology: Copper



Value in use:

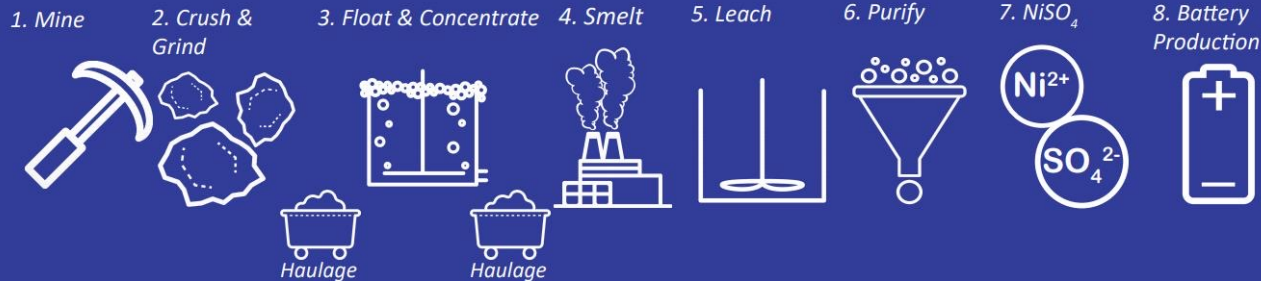
- **Alternative to Acid** - Environmentally benign lixiviant
- **Selective leaching** – Simpler metal extraction
- **Low operating costs** – Glycine is reusable
- **Higher heap leach recoveries** – finer crush sizes
- **Total Available Market ~ US\$ 35 Bn** – 30% of worlds copper from heap leaching oxides (3.5 million tonnes of copper per annum)
- **Superior solution in situations:**
 - **Stranded copper oxide deposits.** Where distance from acid supply sources renders cost of acid uneconomic
 - **Carbonate hosted deposits.** Carbonate/limestone deposits are high acid consumers rendering them uneconomic
 - **Oxides with precious and base metal credits.** GlyLeach enables co-leaching of other metals concurrently

GlyLeach™ Technology: Nickel and Cobalt

A disruptive solution for battery precursor minerals extraction, that greatly reduces CO2 footprint of the operations



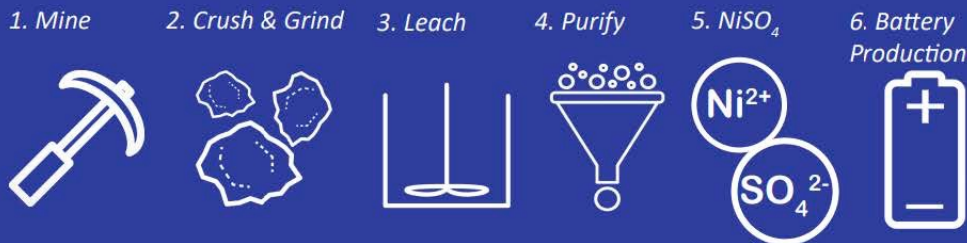
Conventional Nickel Processing:



Disadvantages of conventional processing

- Environmental toxicity issues
- Cost of energy and logistics for haulage
- Arsenic float and contamination issues for smelting
- Iron impurities

GlyLeach™ Nickel Processing:



Advantages of GlyLeach™

- Cleaner & targeted leaching process
- Glycine is a benign, biodegradable lixiviant
- Simpler process
- On-site Nickel Sulphate production
- Minimal transport
- Ambient conditions
- No iron extracted, easier to manage arsenic
- Low operating costs

GlyLeach™: Objectives and ESG Benefits

1. Economically recover 50% of nickel and 40% Co from historic tailings.
Current baseline is zero recovery.
2. Economically recover 55% of nickel and 45% Co from ex-plant fresh tailings.
Current baseline is zero recovery.
3. Recover >88% of nickel from rougher-scavenger flotation concentrates (grade 3-6% Ni).
Current baseline through flotation is 60% recovery of Ni and Co.
4. Demonstrate that “battery grade” specifications can be achieved through simplified refining (compared to current refining practice).
5. Demonstrate the ability to recover and recycle most of the lixiviant and other reagents, and minimise overall waste generation by designing the process for saleable by-products.
6. Investigate the potential of mineral carbonation to sequester CO₂ while increasing the recovery potential of Co and Ni through leaching or flotation

Draslovka

