**[Opening Shot: The University of Arizona Herbarium]**

*(Visuals: Researchers placing plants on the table, preparing samples, scanning, and analyzing data; include a branded UA logo/sign for early viewers.)*

**Narration:**
"At the University of Arizona, new transformative research is reshaping the way we look at the environmental impact of mining. With growing demand for renewable energy, energy storage and technology development, the need for critical metals like nickel has never been greater - in fact, US demand for mineral resources is expected to grow more than 20-fold by 2035.

This increase in nickel consumption and the recent decline in domestic Ni production threatens the resource security of the US, which relies heavily on imported ores and concentrates, making alternative solutions more critical than ever. With $1 million in support from ARPA-E, scientists at the University of Arizona are exploring a nature-inspired solution to this mining problem through phytomining. Using metal-accumulating plants known as hyperaccumulators, this process complements conventional mining and could help increase domestic supplies of nickel (Ni), providing essential resources for clean energy advances.

**[Cut to: Time-lapse of plants growing with overlayed metal concentration graphics]**

"Phytomining offers a sustainable alternative by using plants as nature's own metal harvesters. The larger these metal crops are and the more efficiently they extract metals from the soil, the greater the yield and the closer we get to revolutionising the way we mine the elements that power our future.

**[Cut to: Close-ups of scanning with PXRF Scanner]**"Herbaria hold vast collections of preserved plant specimens collected over decades from all over the U.S. By using this valuable material in advanced non-destructive analysis methods, we can efficiently identify new hyperaccumulator species. One such method is pXRF - a handheld X-ray fluorescence analyser that can determine a plant's metal composition in as little as 45 seconds, saving hours of work without damaging precious herbarium specimens. In partnership with more than 15 herbaria across the country, over 100,000 specimens are being scanned to discover native US plant species capable of accumulating valuable metals".

**[Cut to: Fieldwork Sampling]**

" Once metal-accumulating species are identified in herbarium collections, researchers gather living specimens from their native habitats. This allows them to study the soil conditions, microbial communities and climatic factors that shape metal accumulation, providing key insights for future phytomining applications.

**[Cut to: Greenhouse Validation]**

"Once collected, the plants are tested in the greenhouse to confirm their metal uptake efficiency under controlled conditions, paving the way for large-scale application.

 **Same as the previous – plants recording**

"Researchers also study microbial communities hidden in the soil that could enhance metal uptake and improve plant survival. Understanding these interactions is key to ensuring the highest efficiency and sustainability of phytomining.

**[Cut to: Collaborative Team Discussion]**

"The ultimate goal is to create an open source database of metal accumulating plants. Such high-quality data could empower researchers, policymakers and industry leaders. Although phytomining has shown promise abroad, it remains underexplored in the U.S., making the expansion of domestic capacity key to reducing dependence on foreign supply chains, strengthening national security, and unlocking nature's hidden reserves."

**[Cut to: Researcher speaking to camera]**

*Researcher: {recorded}*
 "Collaborating with experts in microbiology, agronomy, plant biology, and environmental engineering, as well as the Center for Environmentally Sustainable Mining (CESM)—which connects researchers with industry to advance environmentally responsible mining—our research is laying the groundwork for innovations that could reshape land management, mining policies, and critical material security."

**[Cut to: Graphic showing Department of Energy funding and industry collaboration]**

"This initiative bridges science, industry and policy - keeping the US at the forefront of sustainable resource recovery.

**[Closing Scene: Researchers at work, ending with a view of the Herbarium]**

Ultimately, we aim to tackle pressing global challenges by leveraging decades of botanical knowledge preserved in herbaria to unlock the vast potential of plant evolution. By identifying species naturally adapted to metal-rich environments, we can accelerate the adoption of phytomining in the US as a complementary approach to strengthening critical metal supplies.

**[Final Shot: University of Arizona logo and website]**