

Natural Resources Research Institute

UNIVERSITY OF MINNESOTA DULUTH
Driven to Discover

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IRRRB, University to fund study of ilmenite mining potential

Duluth, Minn. – It's long been known that ilmenite – a high value iron-titanium oxide ore – is one of many valuable mineral deposits in northeastern Minnesota. The problem has been in developing a process that would remove impurities so it can be refined for the highest value applications.

The Iron Range Resources and Rehabilitation Board approved funding Monday of \$300,000 to the University of Minnesota Duluth's Natural Resources Research Institute to conduct pre-feasibility, pilot-scale tests. The University of Minnesota's Office of the Vice President for Research and UMD will match with an additional \$300,000. NRRI's goal is to develop a bulk concentrate sample to pilot unique hydrometallurgical technology to general high purity titanium dioxide. Initial testing is extremely promising on the bench-scale. If successful, a full-scale development effort would take place to define economics, impacts, investment and partners.

"This is the first step... to see if we can scale up and prove out this new technology that could expand Minnesota's portfolio of mining opportunities," said NRRI Director Rolf Weberg. "It could be economically beneficial and strategic for the Iron Range, if we can do it safely."

The market value of titanium mineral concentrate is around \$110 per ton, while a ton of today's iron ore sells for about \$45. Titanium can be alloyed with iron, aluminum and other elements to produce strong, lightweight materials for jet engines, space and missile applications as well as dental implants, mobile phones and other products. Refined processing into a powder form can sell for thousands of dollars per ton for use as a white pigment in paints, paper, plastics and other materials. The United States currently does very little ilmenite mining and domestic reserves are very low compared with other countries, especially China.

NRRI will evaluate the potential and economic impact of ilmenite mining at what's called the Longnose Deposit, northeast of Hoyt Lakes, Minn. It is one of 13 deposits identified in Minnesota with ilmenite potential. Compared to mining other ores, the ilmenite is close to the surface (on the order of 15 foot overburden) so that open pit mining would require minimal stripping. The deposit contains very low sulfide mineral concentrations and is extremely low in other elements typically associated with titanium.

The game-changer in accessing this ilmenite resource is a proprietary process developed by a company in Mississauga, Ontario, Canada. [Process Research Ortech](#)'s technology produces the ultra-pure titanium dioxide product needed for high market value. NRRI has obtained over 50 tons of material from the Longnose deposit and has made concentrates to be tested with the new technology.

"This is exciting, but it's just the beginning," said Weberg. "We appreciate the IRRRB's investment and look forward to driving forward new opportunities for the state of Minnesota."

The mission of the Natural Resources Research Institute is to deliver research solutions that balance our economy, environment and resources for resilient communities.

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