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Breakthrough mineral discovery points to ancient meteorite impacts

A team of Curtin University geoscientists has discovered the earliest known occurrence of reidite, one of Earth's rarest minerals. At 1.2 billion years, the finding is more than double the age of the previous oldest known occurrence at 450 million years.

Working with the University of St Andrews, the team, led by Professor Steven Reddy from the Institute for Geoscience Research (TIGeR) at Curtin's Western Australian School of Mines, discovered the reidite in shocked zircon from impact ejecta at Stac Fada in Scotland. He said reidite is important because it is only known to form in nature during meteorite impact events.

"The discovery of this Precambrian occurrence indicates the potential for using the presence of reidite to indicate and record very ancient impact events," Professor Reddy said.

"It is a breakthrough discovery that will help determine terrestrial impact events which have had a profound influence on Earth's geological, geochemical and biological evolution."

Deputy Vice-Chancellor Research and Development Professor Graeme Wright said Curtin is at the forefront of high-impact research and development in minerals and energy sectors.

"In recent years our research activity, particularly in geosciences, has grown significantly, driving Curtin's rapid rise up the international university rankings," Professor Wright said.

All natural occurrences of reidite are associated with the transformation of the mineral zircon during the high pressures and temperatures associated with meteorite impact events. However, the record of Precambrian impacts is poorly constrained due to the dynamic nature of plate tectonics, erosion and deposition of younger rocks, which may destroy or cover the evidence of ancient impacts.

The reidite was discovered using advanced mineral characterisation technologies housed in the John De Laeter Centre at Curtin University. Professor Reddy used a technique called electron backscatter diffraction (EBSD) to effectively discriminate between reidite and its compositionally identical host zircon.

The discovery paves the way for developing reidite as a proxy for meteorite impact events that can be extended back in geological time to provide insights into Earth's early impact record.

Professor Reddy's discovery has been published in the prestigious *Geology* journal and can be viewed online at <http://geology.gsapubs.org/content/34/4/257.abstract?sid=b0db4ab4-7063-416a-a5f7-b0d096565f84>

Images are available upon request.

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