

# Research finds 'fool's gold' not so foolish after all

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Curtin University research has found tiny amounts of gold can be trapped inside pyrite, commonly known as "fool's gold," which would make it much more valuable than its name suggests.

This study, published in the journal *Geology* in collaboration with the University of Western Australia and the China University of Geoscience, provides an in-depth analysis to better understand the mineralogical location of the trapped gold in [pyrite](#), which may lead to more environmentally friendly gold [extraction](#) methods.

Lead researcher Dr. Denis Fougrouse from Curtin's School of Earth and Planetary Sciences said this new type of "invisible" gold has not previously been recognized and is only observable using a scientific instrument called an atom probe.

"The discovery rate of new gold deposits is in decline worldwide with the quality of ore degrading, parallel to the value of precious metal increasing," Dr. Fougrouse said.

"Previously gold extractors have been able to find gold in pyrite either as nanoparticles or as a pyrite-gold alloy, but what we have discovered is that gold can also be hosted in nanoscale crystal defects, representing a new kind of "invisible" gold.

"The more deformed the crystal is, the more gold there is locked up in defects. The gold is hosted in nanoscale defects called dislocations—one hundred thousand times smaller than the width of a human hair—so a special technique called atom probe tomography is needed to observe it."

Dr. Fougrouse said the team also explored gold extraction methods and possible ways to obtain the trapped gold with less adverse impacts on the environment.

"Generally, gold is extracted using pressure oxidizing techniques (similar to cooking), but this process is energy hungry. We wanted to look into an eco-friendlier way of extraction," Dr. Fougrouse said.

"We looked into an extraction process called selective leaching, using a fluid to selectively dissolve the gold from the pyrite. Not only do the dislocations trap the gold, but they also behave as fluid pathways that enable the [gold](#) to be "leached" without affecting the entire pyrite."

**More information:** Denis Fougere et al, A new kind of invisible gold in pyrite hosted in deformation-related dislocations, *Geology* (2021). [DOI: 10.1130/G49028.1](https://doi.org/10.1130/G49028.1)

Provided by Curtin University

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