

Fool's gold gives scientists priceless insight into Earth's evolution

July 22 2011

Fool's gold is providing scientists with valuable insights into a turning point in the Earth's evolution, which took place billions of years ago.

Scientists are recreating ancient forms of the mineral pyrite – dubbed fool's gold for its metallic lustre – that reveal details of past geological events.

Detailed analysis of the mineral is giving fresh insight into the [Earth](#) before the Great Oxygenation Event, which took place 2.4 billion years ago. This was a time when oxygen released by early forms of bacteria gave rise to new forms of plant and animal life, transforming the Earth's oceans and atmosphere.

Studying the composition of pyrite enables a geological snapshot of events at the time when it was formed. Studying the composition of different forms of iron in fool's [gold](#) gives scientists clues as to how conditions such as atmospheric oxygen influenced the processes forming the compound.

The latest research shows that bacteria – which would have been an abundant life form at the time – did not influence the early composition of pyrite. This result, which contrasts with previous thinking, gives scientists a much clearer picture of the process.

More extensively, their discovery enables better understanding of geological conditions at the time, which informs how the oceans and

atmosphere evolved.

The research, funded by the Natural Environment Research Council and the Edinburgh Collaborative of Subsurface Science and Engineering, was published in *Science*.

Dr Ian Butler, who led the research, said: "Technology allows us to trace scientific processes that we can't see from examining the mineral composition alone, to understand how compounds were formed. This new information about pyrite gives us a much sharper tool with which to analyse the early evolution of the Earth, telling us more about how our planet was formed."

Dr Romain Guilbaud, investigator on the study, said: "Our discovery enables a better understanding of how information on the Earth's [evolution](#), recorded in ancient minerals, can be interpreted."

Provided by University of Edinburgh

Citation: Fool's gold gives scientists priceless insight into Earth's evolution (2011, July 22) retrieved 1 May 2024 from

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