

# CSIRO scientist discovers natural 'invisible' gold

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The search for these natural but 'invisible' nanoparticles is important. If they can be proved to exist, the knowledge will help give us a deeper understanding of how gold can be transported and deposited by geological processes, and therefore help explorers to find new gold deposits in Australia.

Now, hard evidence that gold nanoparticles have finally been seen in nature is presented in a paper published in *GEOLOGY* and authored by CSIRO Scientists from the Minerals Down Under National Research Flagship and CRC LEME, in collaboration with scientists from Curtin University and the University of Western Australia.

Lead author, CSIRO's Dr Rob Hough, explains that the particles were discovered in Western Australia. "In the southern areas of the State, groundwater is very salty and acidic. This water dissolves primary gold and re-deposits it as pure gold crystals on fracture surfaces and in open pore spaces," he says.

"On investigation of these crystals, there appeared to be a dark band across them. However, high magnification imaging showed the band was in fact, a mass of gold nanoparticles and nanoplates. These are identical to those being manufactured in laboratories around the world for their unique properties."

Clays from the fracture surface were then analysed. There was no gold visible, but analysis showed the clays contained up to 59 parts-per-

million of gold. The research team concluded that the nanoparticles of gold they had imaged represented the 'invisible' gold in the clay, and that this nanosized gold was common in similar environments.

"The gold nanoparticles have not been identified earlier because they are transparent to electron beams and effectively invisible," Dr Hough says. "However, they are probably a common form of gold in this type of natural environment worldwide, where saline water interacts with gold deposits. They also provide the first direct observation of the nanoscale mobility of gold during weathering."

With gold fetching around (AU) \$950 an ounce and expected to rise, this research is good news for Australia's gold explorers.

Source: CSIRO Australia

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