Life's "Signature" not found in Martian Meteorite according to new research by chemists at UCSD

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LIFE'S "SIGNATURE" NOT FOUND IN MARTIAN METEORITE ACCORDING TO NEW RESEARCH BY CHEMISTS AT UCSD

Grains of carbonate minerals believed to signal previous life on a Martian meteorite are most likely non-biologic in origin, according to new studies by chemists at the University of California, San Diego.

In a study reported in the current issue of the journal Science, the UCSD scientists report that the carbonates laced through the potato-sized rock are the product of reactions with atmospheric carbon dioxide.

"This data suggests that the carbonates were made by the interaction with the atmosphere rather than with the water on the surface, as would be required for a biologic process," said Mark Thiemens, professor of chemistry and biochemistry at UCSD and principal investigator of the study. Other co-authors of the study were UCSD chemists James Farquhar and Teresa Jackson.

The new results are based on the first multi-oxygen isotopic examination of carbonate globules in the meteorite, named Allan Hills 84001 (ALH84001). Isotopes are atomic elements that have the same chemical properties, but different weights and slightly different physical properties.

In August 1996, research teams at NASA's Johnson Space Center and Stanford University announced their belief that at least parts of the brown-colored carbonates found in ALH84001 bore a striking resemblance to the earliest microfossils on earth, suggesting past life on Mars.

To see if the origin of the carbonates could be determined, the UCSD chemists measured the proportions of oxygen 16, oxygen 17 and oxygen 18 found in the sample, seeking clues in the form of clear isotopic "signatures." An isotopic signature to a chemist is what a fingerprint is to a detective. For the carbonates, the UCSD scientists wanted to find out if the fingerprints matched oxygen from the atmosphere or oxygen from the hydrosphere.

If the signature pointed toward a water origin, that would support that case for life, since on this planet and elsewhere, the genesis for all life is water. If the signature matched the oxygen isotopes from the Martian atmosphere, that would suggest a non- biologic origin.

"So if these things were biogenic, they should have equilibrated with water," said Thiemens. "They didn't. They equilibrated with the atmosphere.

"What it looks like is that the Martian oxygen isotopes came from the Martian carbon dioxide atmosphere. So what we're seeing looks like a garden variety precipitate of carbonates, rather than life."

To continue his search for life's signature, Thiemens and other scientists look forward to the next mission to Mars in 2005 when samples of the atmosphere and rock are expected to be retrieved and returned to earth.

"In the meantime, there's a suite of Martian meteorites that we'll look through and we'll do the same analyses," Thiemens said.

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