Page last updated at 13:24 GMT, Tuesday, 16 February 2010

Space rock contains organic molecular feast

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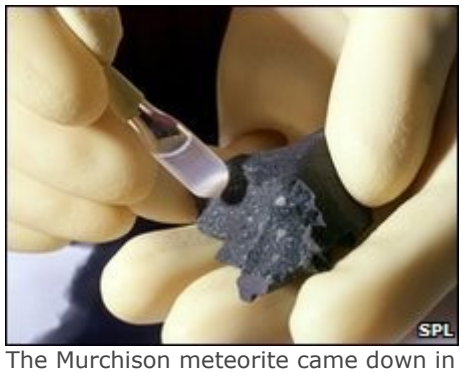

The Murchison meteorite came down in Australia in 1969

Scientists say that a meteorite that crashed into Earth 40 years ago contains millions of different carbon-containing, or organic, molecules.

Although they are not a sign of life, such organic compounds are life's building blocks, and are a sign of conditions in the early Solar System.

It is thought the Murchison meteorite could even be older than the Sun.

The results of the meteorite study are published in the Proceedings of the National Academy of Sciences.

"We are really excited. When I first studied it and saw the complexity I was so amazed," said Philippe Schmitt-Kopplin, lead researcher on the study from the Institute for Ecological Chemistry in Neuherberg, Germany.

"Having this information means you can tell what was happening during the birth of the Solar System," Dr Schmitt-Kopplin told BBC News.

"Meteorites are like some kind of fossil. When you try to understand them you are looking back in time," he explained.

> **"We have to crush a few milligrams from the core of the meteorite"**
>
> Dr Philippe Schmitt-Kopplin

The researchers says the identification of many different chemicals shows the primordial Solar System probably had a higher molecular diversity than Earth.

The Murchison meteorite landed in a town of that name in Australia in 1969. It has been examined before by scientists looking for specific compounds but this is the first non-targeted analysis and has confirmed a huge variety of carbon-based chemicals.

A study using high resolution analytical tools including spectroscopy allowed the team to identify 14,000 different compounds.

The scientists extrapolated the number on the basis of previous analyses done on natural organic matter.

The ultra-high-resolution mass spectrometry used shows only a fraction of the compounds that exist in the material being analysed, in this case the meteorite.

However the scientists say the prior studies allow them to make a good estimate of the total number of compounds. "We were very conservative in our calculations and interpolation," said Dr Schmitt-Kopplin.

"We have to crush a few milligrams from the core of the meteorite to enable the extractions with solvents and thus we only see the extractable fraction."

Burning question

Scientists believe the Murchison meteorite could have originated before the Sun was formed, 4.65 billion years ago. The researchers say it probably passed through primordial clouds in the early Solar System, picking up organic chemicals.

Dr Schmitt-Kopplin hopes the findings might contribute to the debate over how life on Earth originated.

"I guess many people working in these fields with access to this knowledge will have some further hypothesis and will possibly be having some of their hypotheses confirmed."

"Where did we come from and what happened before? We all have that question inside us."

The team is also analysing other meteorites but say Murchison is probably the most complex they have studied.