

# Life on Mars: just add carbon and stir

May 29 2012, By Marion Anderson

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NASA (Viking 1, February 1978)

The building blocks of life have been discovered on Mars ... in Martian meteorites that fell to Earth.

Let me rephrase that: according to a paper by published in [Science Express](#) on Friday, meteorites from [Mars](#) have been found to contain the basic ingredients for [life](#) as we know it.

This is amazingly, mind-bogglingly awesome!

The last time a headline like this made the front pages of most of the

papers was [back in 1996](#), when evidence of organic life and “fossils” had been found in a [meteorite that had fallen](#) to Earth from Mars.

But a few years later, after a lot more research, the results fell into [dispute](#). In the words of American astronomer Carl Sagan, “[extraordinary claims require extraordinary evidence](#)” and the evidence wasn’t quite enough to convince all the scientists doing research on the evolution of life on Earth (or Mars).

Now [some commentators](#) are saying that the new data, published by a team of international researchers, proves the 1996 meteorite didn’t contain evidence of life. Others say that it proves that life could have existed on Mars in the past.

So, who is right? Does this new data mean there is life on Mars today? Have they proved that life existed on Mars in the past?

No, and no. What has been found is that many samples of Martian rock contain [carbon](#) that has not been made by life. But this new research means there is a better chance of life having evolved on Mars.



NASA's Curiosity rover touches down in August and will resume the search for life on Mars. Credit: NASA

Some time later this year, or early next, you may be reading a newspaper headline stating life has been found on Mars. This will also be awesome!

Headlines such as these would come from the results of a new Mars rover named “Curiosity” – a scientific laboratory on wheels, [which will land on Mars](#) on August 5.

Its task is to take samples of Martian rocks and look for evidence of past life. It won’t be looking for fossils or skeletons (although if it found them you’d hear champagne corks popping all over Earth). Curiosity will be looking for the chemical signatures of organic life in the form of particular types of carbon compounds.

To make life as we know it (on Earth), you need carbon – preferably in the form of “[reduced](#)” carbon compounds. *The [Science Express](#)* paper tells us how these have now been found in a number of meteorites from Mars.

So what’s so interesting about carbon? Carbon is the stuff that diamonds are made of, but not all carbon makes gemstones. Some of it makes up graphite (the “lead” in pencils), while other arrangements of carbon atoms make up buckyballs and nanotubes – the toys of nanotechnology.

Life on Earth isn’t made up of any of these forms of carbon: it’s composed of “organic” carbon – long chains of carbon atoms joined to other elements such as oxygen, hydrogen and nitrogen.

The oldest forms of organic carbon we’ve found on [Earth](#) are “reduced” carbon chains trapped in rocks that would have formed in ideal conditions for life to survive. And once these are around, any living organisms can use them to make more of themselves.

And it is these types of reduced carbon that have now been found in meteorites from Mars.

Is this exciting? Hell, yeah! It means you've got the ingredients for potential life in rocks from another planet. It means that Curiosity has a much better chance of finding what it is looking for.

But, there is one major drawback about these new findings.

As mentioned, the carbon found in these meteorites was not made by living things – it was made through natural chemical reactions that do not involve life.

This means that when we look at the results coming from Curiosity later this year, we will have to take a lot more care to make sure the types of carbon found contain the signatures ([isotopic fingerprints](#)) of having been made by life. Fortunately, that is well within the capability of Curiosity's mobile laboratory.

So, put the champagne on ice – the search for life on Mars is about to get interesting.

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