WASHINGTON, Sept. 19 (Xinhua) -- U.S. space agency NASA said Thursday its Curiosity rover has revealed no trace of methane, a potential sign of life, on the Martian surface.

Over the past decade, researchers have reported "plumes" of the gas in the Martian atmosphere, sparking interest in the possibility of a biological source on Mars.

However, since those reports were made from either Earth or an orbiting satellite, such claims have remained controversial.

The Curiosity rover, which landed on the Red Planet in August 2012, analyzed samples of the Martian atmosphere for methane six times from last October through June.

"We did not find nor detect methane in the Martian atmosphere," Chris Webster of NASA's Jet Propulsion Laboratory told Xinhua.

"Our Curiosity measurements show that the current Martian atmosphere contains very little or no methane, a gas that on Earth is produced by biological processes, and is therefore a potential signature of life on Mars," Webster said.

The researchers reported in the journal Science that they ruled out the possibility of methane disappearing quickly from the Martian atmosphere.

"Methane is persistent. It would last for hundreds of years in the Martian atmosphere," said one of the paper's co-authors, Sushil Atreya of the University of Michigan.

"Without a way to take it out of the atmosphere quicker, our measurements indicate there cannot be much methane being put into the atmosphere by any mechanism, whether biology, geology, or by ultraviolet degradation of organics delivered by the fall of meteorites or interplanetary dust particles," Atreya said.

Given the sensitivity of the Tunable Laser Spectrometer (TLS) used, and the fact that it has not detected the gas, researchers calculated the amount of methane in the Martian atmosphere today must be no more than 1.3 parts per billion, about six times lower than previous estimates.

According to the researchers, Curiosity's Sample Analysis at Mars (SAM) laboratory has yet to conduct the "methane enrichment" experiment that will increase the sensitivity of TLS even further by a factor of at least 10.

"It's possible that we may then see methane at extremely low levels whose origin could be localized geochemistry or microbial activity, but at a much reduced scale than previously thought," said Webster, the Science paper's lead author.

The researchers said the lack of methane on Mars therefore "severely constrains" the
occurrence of current microbial activity from methanogens that are known to produce methane.

"This important result will help direct our efforts to examine the possibility of life on Mars," said Michael Meyer, NASA's lead scientist for Mars exploration, in a statement. "It reduces the probability of current methane-producing Martian microbes." But the researchers also noted that this study addressed only one type of microbial metabolism and there are still many types of terrestrial microbes that don't generate methane.

"We know on Earth that there are other microbes that do not produce methane, and these could still be active on Mars in the subsurface shielded from UV (ultraviolet) radiation," Webster added.