

## China's AI Robot Produces Oxygen for Mars Mission

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An AI-controlled chemical robot developed by Chinese scientists has automatically synthesized catalysts for the oxygen evolution reaction from Martian meteorites. At the same time, it intelligently optimized the method and presented a highly efficient and energy-saving solution for oxygen production on Mars, according to the study published Monday in the Journal Nature Synthesis. [2]



*Photo taken with a mobile phone shows researchers working with an AI-controlled chemical robot at the University of Science and Technology of China in Hefei, east China's Anhui Province, Nov. 10, 2023. (Photo: Zhou Chang / Xinhua)*

Using a machine learning model, the AI robot automatically and quickly determined the optimal catalyst formula from more than three million possible compositions. This groundbreaking discovery

demonstrates the feasibility of AI chemists in automated synthesis of chemicals and materials for Mars exploration.

Life on Mars requires the ability to synthesize chemicals essential to survival, such as oxygen, from local resources. However, this is a difficult task.

Recent evidence of water activity on Mars has raised the prospect of large-scale oxygen production through solar-powered electrochemical water oxidation processes. Given the high cost of transporting catalysts from Earth, extraterrestrial catalysts made from local materials from Mars have become a key technical issue.

Researchers from the University of Science and Technology of China (USTC), in collaboration with colleagues from research institutes such as the Deep Space Exploration Laboratory, used an AI chemistry robot to analyze and extract components from Martian meteorites and synthesize a new catalyst in just six weeks.

With five different local Martian ores as source material, there are over 3.76 million possible formulas. Humans would work for around 2,000 years to complete such a search for the optimal formula.

A stress test at minus 37 degrees Celsius, roughly equivalent to the temperature conditions on Mars showed that the catalyst can continuously produce oxygen without any obvious deterioration.

The study proved that AI can automatically develop new materials that support oxygen production, base construction and food production on extraterrestrial planets, said Luo Yi, director of the Hefei National Research Center for Physical Sciences at the Microscale (USTC).

## References

[1] <https://German.people.cn>

[2] <https://www.nature.com/articles/s41467-024-45483-w>