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## Rover confirms presence of sulphur on surface of Moon

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**NEW DELHI:** Chandrayaan-3's Pragyan rover module has confirmed the presence of sulphur on the surface of Moon, the Indian Space Research Organisation (ISRO) said on Tuesday, sharing the results of the first such in-situ recordings near the lunar south pole that will be crucial for understanding the Moon's elemental composition.

A search for Hydrogen is underway, the agency said.

"Laser-Induced Breakdown Spectroscopy (LIBS) instrument onboard the Rover unambiguously confirms the presence of Sulphur (S) in the lunar surface near the south pole, through first-ever in-situ measurements," ISRO said in a statement.

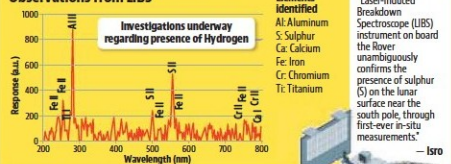
Apart from sulphur, the agency said, the rover has detected elements including aluminium (Al), calcium (Ca), iron (Fe), chromium (Cr), titanium (Ti), manganese (Mn), silicon (Si), and oxygen (O).

"Preliminary analyses, graphically represented, have unravelled the presence of aluminium (Al), sulphur (S), calcium (Ca), iron (Fe), chromium (Cr), and titanium (Ti) on the lunar surface. Further measurements have revealed the presence of manga-

### Discoveries on lunar surface

Chandrayaan-3's Pragyan rover has confirmed the presence of sulphur on the lunar surface, in the first such measurements

#### Observations from LIBS



#### Significance of the findings

The findings near the lunar south pole will be crucial for understanding the Moon's elemental composition. "A lot of our findings will be critical because we will be getting that information for the first time" — Anil Bhardwaj, director, ISRO's Physical Research Laboratory

nese (Mn), silicon (Si), and oxygen (O). Thorough investigation regarding the presence of hydrogen is underway," the statement said. The findings are the first time such data has been gathered and is set to prove critical in the understanding the Earth's natural satellite.

Anil Bhardwaj, director, Phys-

ical Research Laboratory, one of ISRO's labs involved in the lunar mission, said that India has an advantage since no other country has managed to land near the south pole of the Moon — a feat India achieved on August 23.

"We are the first country to have landed on the south polar region of the moon and we have

#### 'First-ever measurements'

"Laser-Induced Breakdown Spectroscopy (LIBS) instrument on board the Rover unambiguously confirms the presence of sulphur (S) on the lunar surface near the south pole, through first-ever in-situ measurements."

ISRO chairman Somanath said that there is a possibility for the mission life to be extended for another lunar day if the equipment withstands the low lunar temperatures during lunar night, and recharges itself again once the Sun rises again on the Moon.

Days after the ChaSTE probe on the lander Vikram recorded temperature variations on the Moon's surface, the composition of elements was recorded by LIBS — a technique wherein the surface of a material, such as soil or rock bed, is exposed to high-energy laser pulses.

This generates a high temperature, localised plasma which is then collected and spectrally resolved and detected by instruments such as Charge Coupled Devices.

Each element has a unique set of wavelengths of light, senior ISRO scientists explained. It is based on this wavelength of light that the elemental composition of the surface is determined.

LIBS was developed at the Laboratory of Electro-Optics Systems (LEOS), a unit of ISRO that deals with the design, development and production of attitude sensors for all low earth orbit (LEO) and Geostationary Equatorial Orbit (GEO) and interplanetary mission.

an advantage. A lot of our findings will be critical because we will be getting that information for the first time. We are currently focusing on collecting maximum data before the lunar sunset," Bhardwaj said.

The mission is set to go on till September 6, when the Sun sets on the Moon, even though the