



# Chandrayaan-1 Findings

## Why in News

The recent images sent by Chandrayaan-1 suggest that the **moon may be rusting along the poles.**

- Chandrayaan-1, India's **first mission to the moon**, was **launched by the [Indian Space Research Organisation \(ISRO\)](#)** in **2008**.

## Key Points

### ▪ Finding:

- Data from the Mineralogy Mapper (M3), one of the instruments on Chandrayaan-1, indicates the **presence of hematite at the lunar poles.**
  - **Hematite ( $\text{Fe}_2\text{O}_3$ )** is a **mineral which is a form of iron oxide, or rust**, produced when iron is exposed to oxygen and water.
- The sign of this finding is that even though the **surface of the moon** is known to have **iron-rich rocks**, it is **not known for the presence of water and oxygen**, which are the **two elements needed to interact with iron to create rust.**
  - Recently, the [National Aeronautics and Space Administration \(NASA\)](#) has found evidence of greater quantities of [metals such as iron](#) and titanium on the moon's subsurface.

### ▪ Possible Reasons Behind Rusting along the Lunar Poles:

- As per scientists at NASA, **earth's oxygen** could be driving the **formation of hematite.** Earth's **magnetotail** (elongated region of the [magnetosphere](#) of the earth) ferries oxygen to the moon and also blocks 99% of solar wind during certain periods of the moon's orbit.
  - The **solar wind**, a stream of charged particles that flows out from the sun, **bombards earth and the moon with hydrogen.**
  - **Hydrogen makes it harder for hematite to form.** It is a reducer, meaning it adds electrons to the materials it interacts with. That's the opposite of what is needed to make hematite or iron to rust, which requires an oxidizer, which removes electrons.
- Chandrayaan-1 Moon data **indicates that the moon's poles are home to water** that scientists are trying to decipher.

### ▪ Chandrayaan-3: It is likely to be launched in early **2021**.

- It will be a **mission repeat of [Chandrayaan-2](#)** and will **include a Lander and Rover** similar to that of Chandrayaan-2, but will **not have an orbiter.**
  - Planned to **land on the South Pole of the Moon, Chandrayaan-2** was launched on 22<sup>th</sup> July in **2019**. However, the [lander Vikram hard-landed](#) on 7<sup>th</sup> September 2019, crashing India's dream to become the first nation to successfully touch down

- on the lunar surface in its maiden attempt.
- With the [Artemis program](#), **NASA** will land the first woman and next man on the moon by 2024.
  - India's **first ever human space mission** [Gaganyaan](#) aims to send a three-member crew to space for a period of five to seven days by 2022 when India completes 75 years of Independence.

## Way Forward

The findings will reshape scientists' knowledge about the moon's polar regions. It also suggests that the Earth may have played an important role in the evolution of moon's surface. However, more data is needed to determine exactly how the water is interacting with rock.

**[Source: PIB](#)**

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