

Chandrayaan-2 observes Argon-40 in lunar exosphere

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In news- Chandra's Atmospheric Composition Explorer-2 (CHACE-2) instrument onboard India's 2017 Chandrayaan-2 orbiter has made new exciting observations related to the distribution of an important gas (Argon-40) in the tenuous lunar exosphere, recently.

Key observations-

- **For the first time, the CHACE experiment** onboard Chandrayaan-2 orbiter has continuously **observed Ar-40 in the latitude range of -60 to +60 degrees.**
- The study also mentioned that the observed global distribution indicated that the interaction of Ar-40 with the surface is similar in low and mid-latitude regions.
- This new observation is responsible for **providing insights into the dynamics of the lunar exosphere in the first few tens of meters below the lunar surface.**
- This is **not the first time that Argon-40 has been detected on the lunar surface,** the detections earlier were limited to near-equatorial regions as seen by the Apollo-17 mission.
- **The CHACE-2 observations reveal an increase in the number density of Argon-40 near the sunrise terminator,** a decrease along the dayside, a secondary peak near the sunset terminator and a night-side minimum.
- However, the **biggest revelation was that the density of Argon-40 with respect to solar longitudes is similar to that of low latitude regions,** despite the differences in temperature and topography.
- **CHACE-2 was a sequel to the CHACE experiment on the Moon Impact Probe (MIP) of Chandrayaan-1 mission** and also

draws heritage from the Mars Exospheric Neutral Composition Analyser (MENCA) experiment aboard the Indian Mars Orbiter Mission.

What are noble gases?

- The noble gases are colourless, odourless, tasteless, nonflammable gases.
- Noble gas, are any of the seven chemical elements that make up Group 18 (VIIIa) of the periodic table.
- The elements are *helium (He), neon (Ne), argon (Ar), krypton (Kr), xenon (Xe), radon (Rn), and oganesson (Og)*.

About Argon-40-

- Argon-40 is one of the isotopes of the noble gas Argon, an inert, colourless and odourless element found on the Earth that **originated from the radioactive disintegration of Potassium-40 (K-40)** present below the lunar surface.
- According to ISRO, once the disintegration is formed, it diffuses through the inter-granular space and makes its way up to the lunar exosphere through faults.

Further reading: <https://journalsofindia.com/chandrayaan-3/>