

Is the solar system nitrogen





Overview

Within our own solar system, nitrogen is a significant component of many planetary atmospheres. Earth's atmosphere is composed of approximately 78% nitrogen gas (N_2), making it the most abundant gas on our planet. Mars has trace amounts, with its atmosphere containing about 2.7% nitrogen. Is nitrogen a uniform molecule in the Solar System?

Nitrogen within the solar system is not isotopically uniform: $^{15}N/^{14}N$ ratios in planetary objects such as Earth, Mars, and Jupiter range from 1.9 to 5.9×10^{-3} (1), some meteoritic materials exhibit ratios as high as 22×10^{-3} (2), and samples from the lunar surface reveal an unexplained variability between 2.8 and 4.3×10^{-3} (3).

Where does Earth's nitrogen come from?

New research by Rice University shows that Earth's nitrogen came from both inner and outer regions of the disk that formed our solar system, contrary to earlier theory. Image credit: NASA/JPL-Caltech. "Our work completely changes the current narrative," said Rice University graduate student and lead author Damanveer Grewal.

Is nitrogen a chemical element?

Category: Nitrogen Nitrogen is a chemical element; it has symbol N and atomic number 7. Nitrogen is a nonmetal and the lightest member of group 15 of the periodic table, often called the pnictogens. It is a common element in the universe, estimated at seventh in total abundance in the Milky Way and the Solar System.

Where is elemental nitrogen found?

Elemental nitrogen can also be found in the outer Solar System. Again Peterh notes the case of Titan. Not only is nitrogen in the atmosphere of Titan, it may enter the hydrocarbon lakes as well.

Why do we have two different isotopes of nitrogen?



A synthesis of these analyses suggests that these distinct reservoirs may be the result of early fractionation processes. The relative proportion of the two isotopes of nitrogen, ^{14}N and ^{15}N , varies dramatically across the Solar System, despite little variation on Earth.

Will Earth be a major source of orbital nitrogen?

Since we are talking about harvesting nitrogen from other planets and moons, Earth is likely to be the major source of orbital nitrogen for a long, long time. If the SpaceX Starship and other super-heavy reusable rockets work as planned, we may soon be able to put up to 150 tons of Nitrogen into orbit for a few million dollars.



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[Nitrogen Isotopes on the Moon: Archives of the Solar and ...](#)

The two isotopes of nitrogen, ^{14}N and ^{15}N , have relative abundances extremely variable among solar system reservoirs such as planets and their atmospheres, primitive and differentiated ...

[New Insights Into How Earth Got Its Nitrogen . News , Astrobiology](#)

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