



Abundance of Lithium in Stars

Why in News

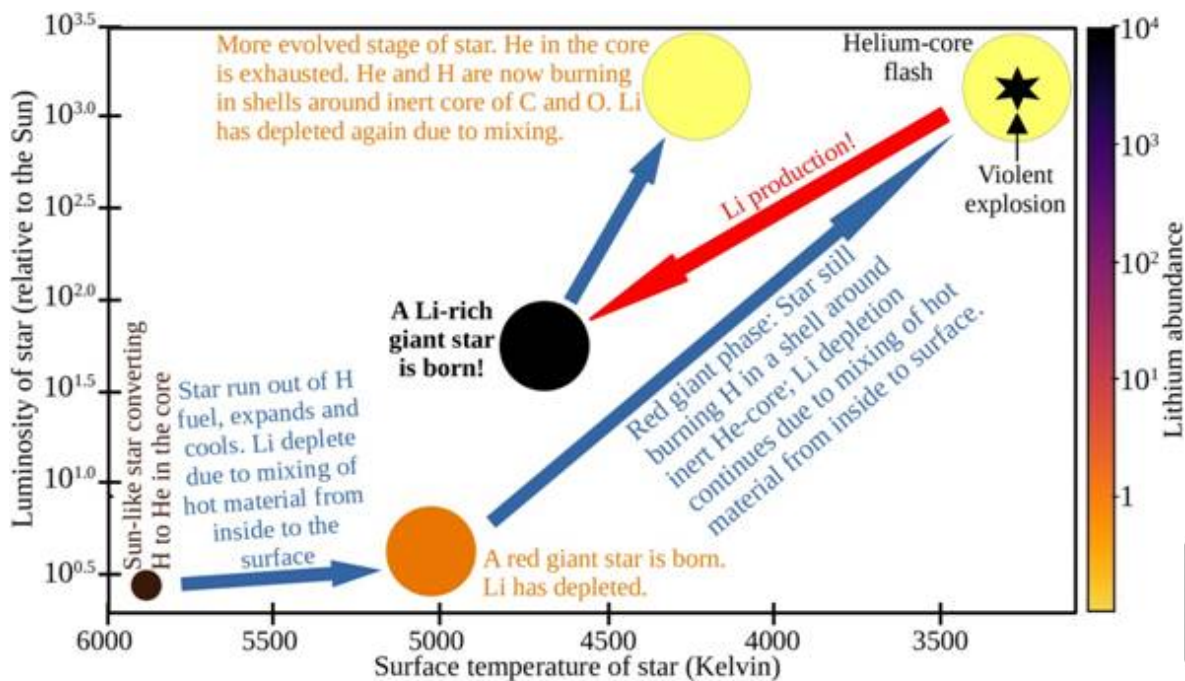
Recently, Scientists have found a clue to the **mystery behind the high abundance of Lithium** in some evolved stars.

- The mystery is the reason behind the high abundance of Lithium in stars, which according to predicted models **must get destroyed in the hot plasma of the star.**
- Lithium is a **trace element on Earth**, and a key **component of rechargeable batteries.**



Key Points

- **Sample for Research:** The research involved the investigation of lithium among red giants showed that just about **1% of sun-like red giants** had a lithium-enriched surface.
- **Research Methodology:** The research surveyed (called **GALAH - named after a common Australian bird**) a collection of about **500,000 stars with well-determined physical and chemical properties**, including lithium abundances.
- **Findings of Research:** Regarding the reason for Lithium production, scientists have for the first time confirmed that all the **lithium-rich stars are burning helium in their core.**
 - They speculated that lithium production is linked to the **violent helium-core flash.**
 - It is proposed to be a simple and short sequence of **nuclear reactions involving a collision between the two stable helium isotopes which led to a stable lithium isotope.**
 - The survey revealed the rare presence of lithium-rich giants in all the **Sun-like low-mass stars.**



A cartoon illustration of the evolution of lithium (Li) in a Sun-like star. Color of the star symbol (filled circle) is proportional to star's Li abundance as shown in the color bar. Here, H is hydrogen, He is helium, C is carbon and O is oxygen.

About Lithium

▪ Properties of Lithium:

- It is a **chemical element** with the symbol Li.
- It is a **soft, silvery-white metal**.
- Under standard conditions, it is the **lightest metal and the lightest solid element**.
- It is **highly reactive and flammable**, and must be stored in mineral oil.
- Lithium has become the **new 'white gold'** as the demand for high performing **rechargeable batteries** is rising.
- Rising global lithium demand and surging prices have drawn increased interest in the so-called **'lithium triangle' that spans parts of Argentina, Bolivia and Chile**.



▪ **Uses:**

- Lithium metal is used to make **useful alloys**.
 - **For example**, with lead to make 'white metal' bearings for motor engines, with aluminium to make aircraft parts, and with magnesium to make armour plates.
- In Thermonuclear reactions.
- To make electrochemical cells. Lithium is an important component in [Electric Vehicles](#), Laptops etc.

▪ **Countries with Largest Reserves:**

- Chile > Australia > Argentina

▪ **Lithium in India:**

- Researchers at the Atomic Minerals Directorate (under India's Atomic Energy Commission) have estimated lithium reserves of 14,100 tonnes in a small patch of land surveyed in [Southern Karnataka's Mandya district](#) recently.

- Also to be India's first ever Lithium deposit site found.

▪ **Other Potential Sites in India:**

- The major **mica belts in Rajasthan, Bihar, and Andhra Pradesh**.
- **Pegmatite** (igneous rocks) belts in Odisha and Chhattisgarh.
- **Brines of Sambhar and Pachpadra in Rajasthan, and Rann of Kachchh in Gujarat**.

▪ **Related Government Initiative:**

- India, through a newly state-owned company **Khanij Bidesh India Ltd**, had signed an agreement with an Argentinian firm to jointly prospect lithium in Argentina.

- **Khanij Bidesh India Ltd** has a specific mandate to acquire strategic mineral assets such as lithium and cobalt abroad.

Source: PIB

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