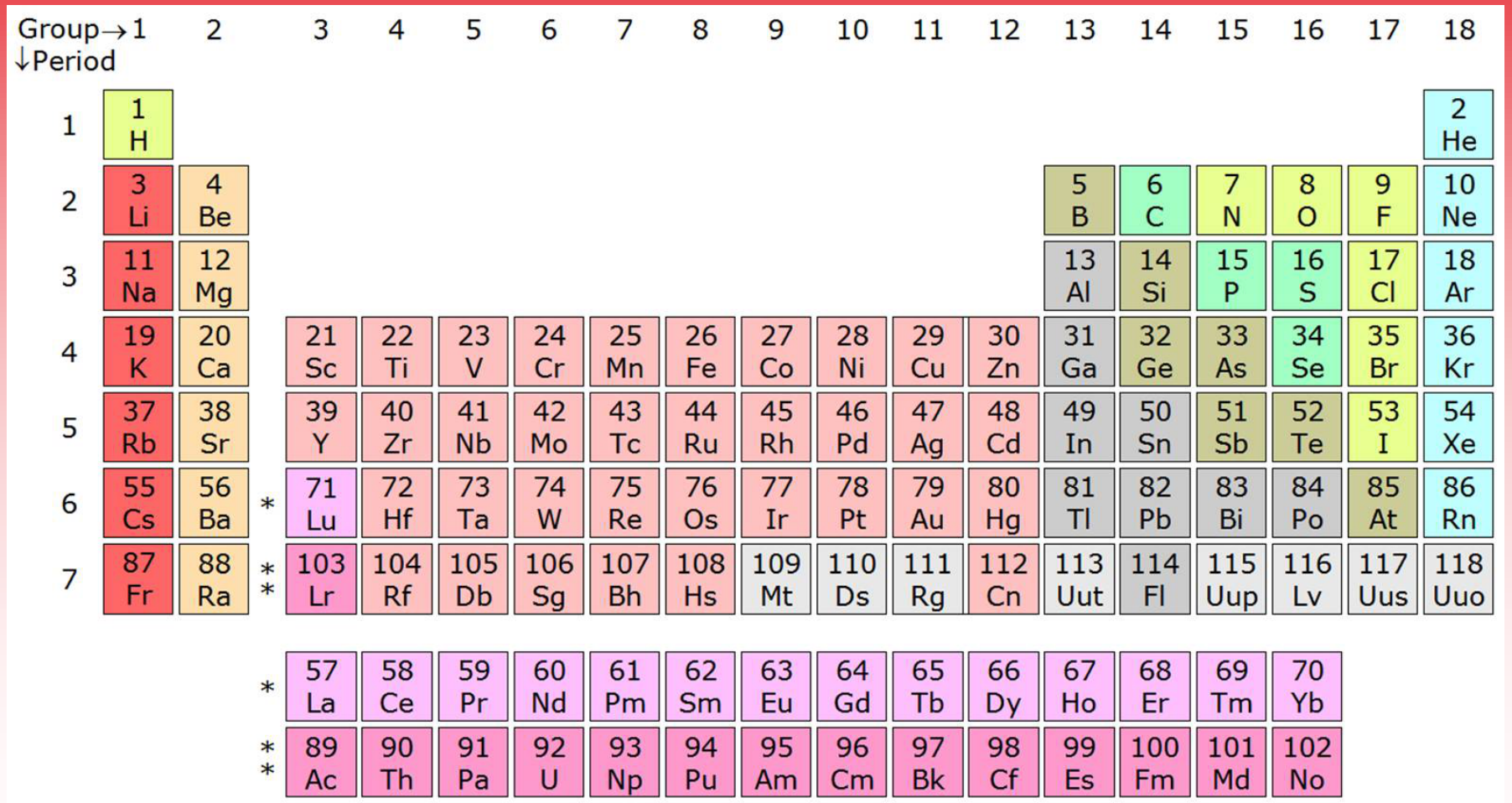
Elements of the Solar System

Physics 090

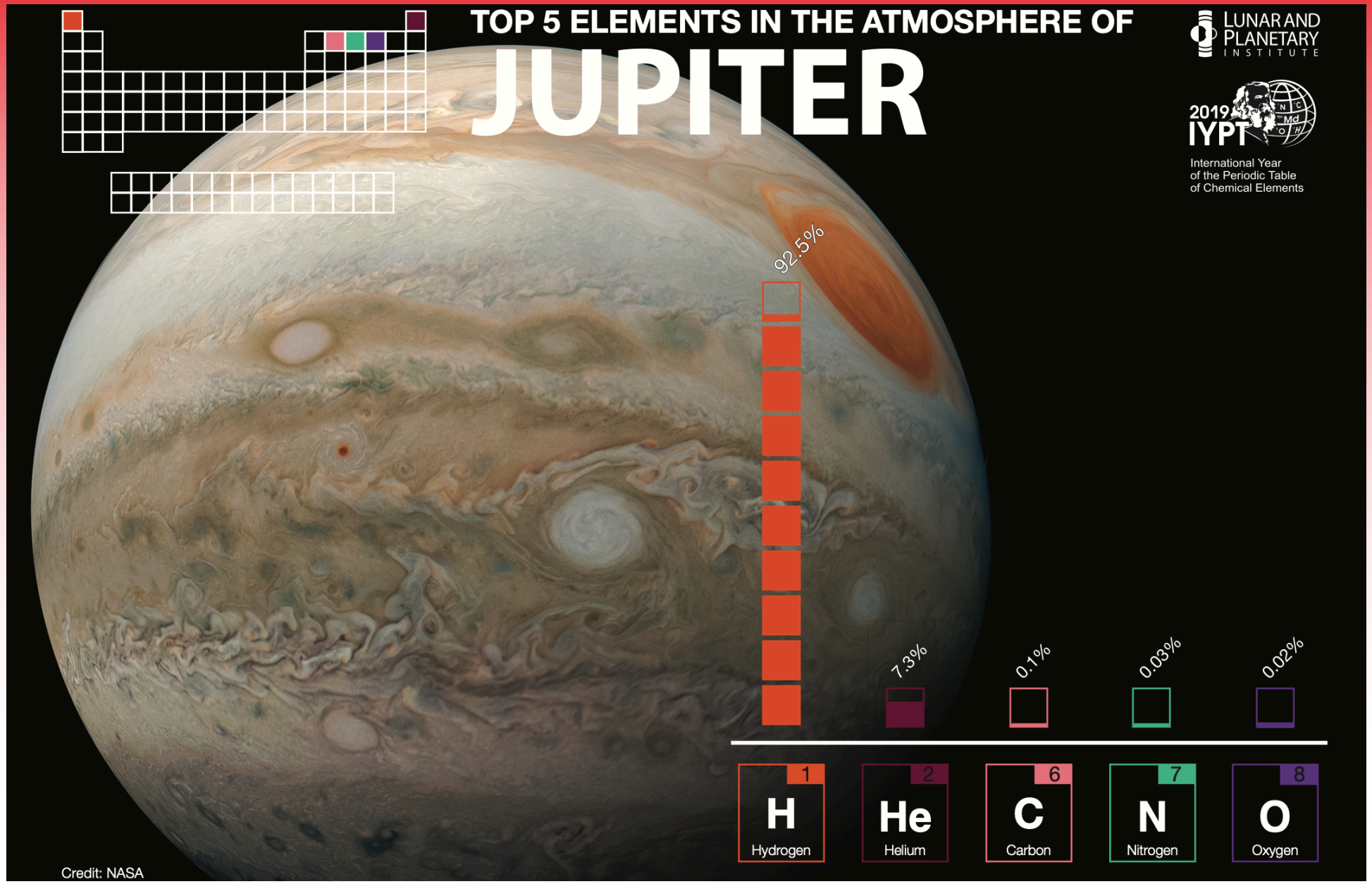
2020-04-01

SAINT MARY'S COLLEGE of CALIFORNIA



The Periodic Table

What Elements are Most Common? In the Sun? On Earth?



Most Common Elements in Jupiter's Atmosphere

The Most Common Elements in the Solar System

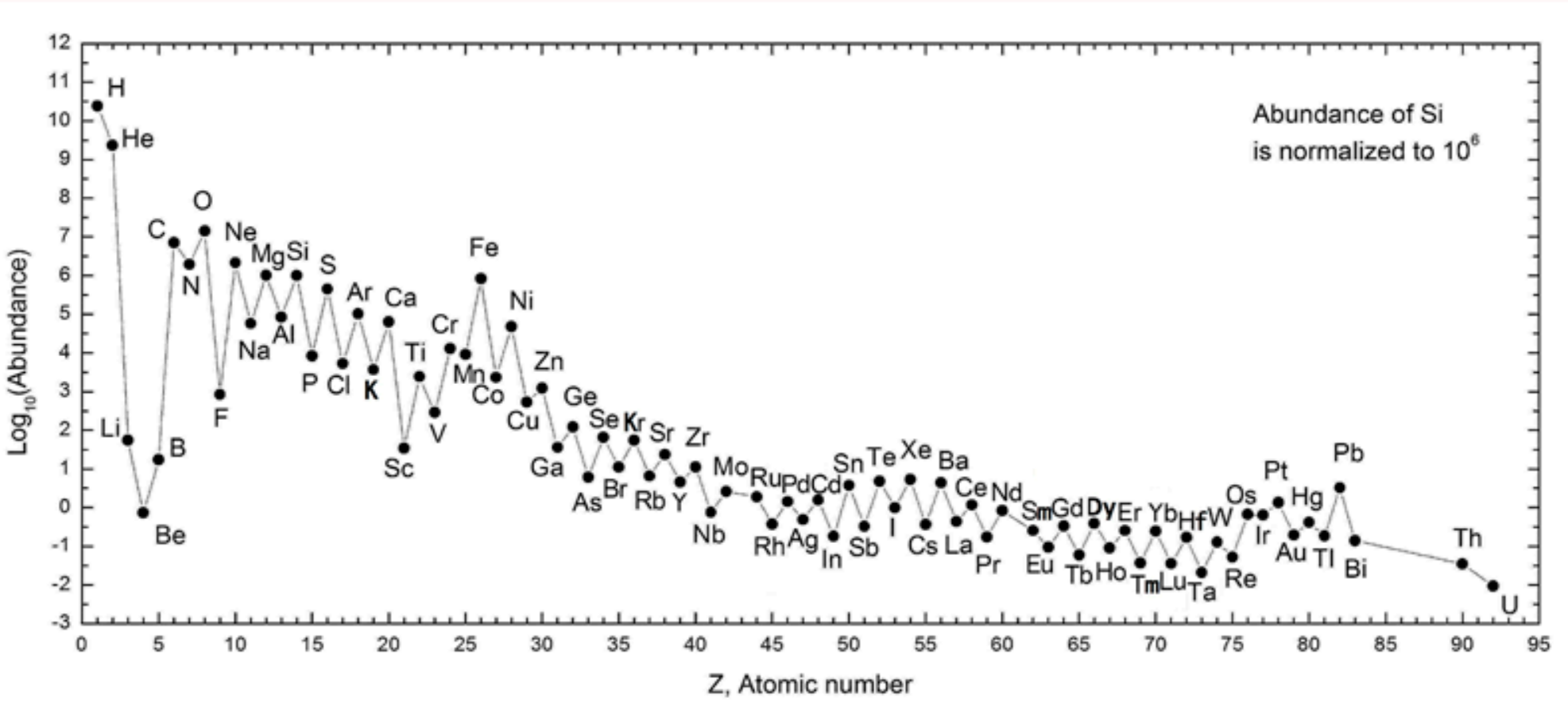
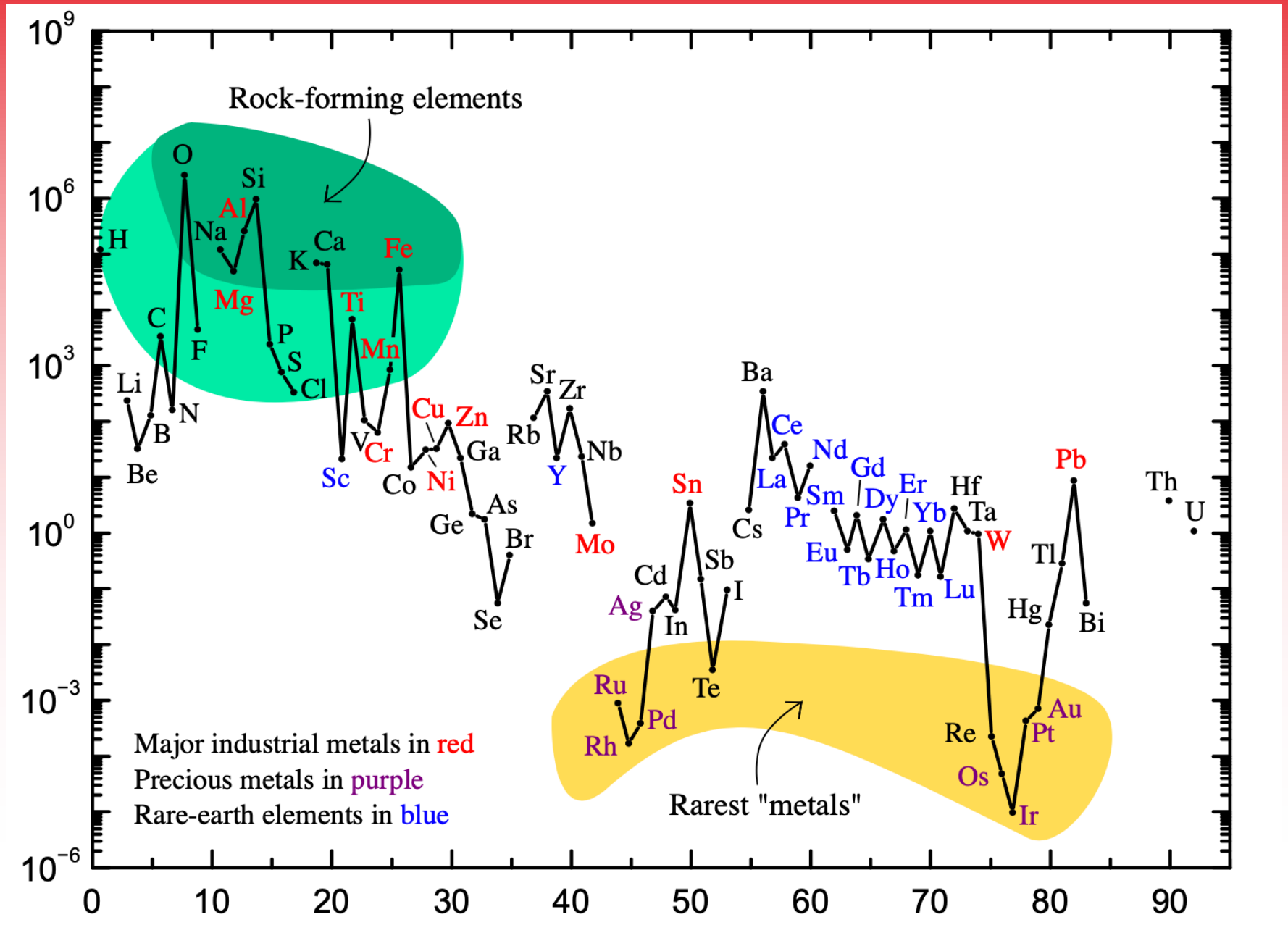
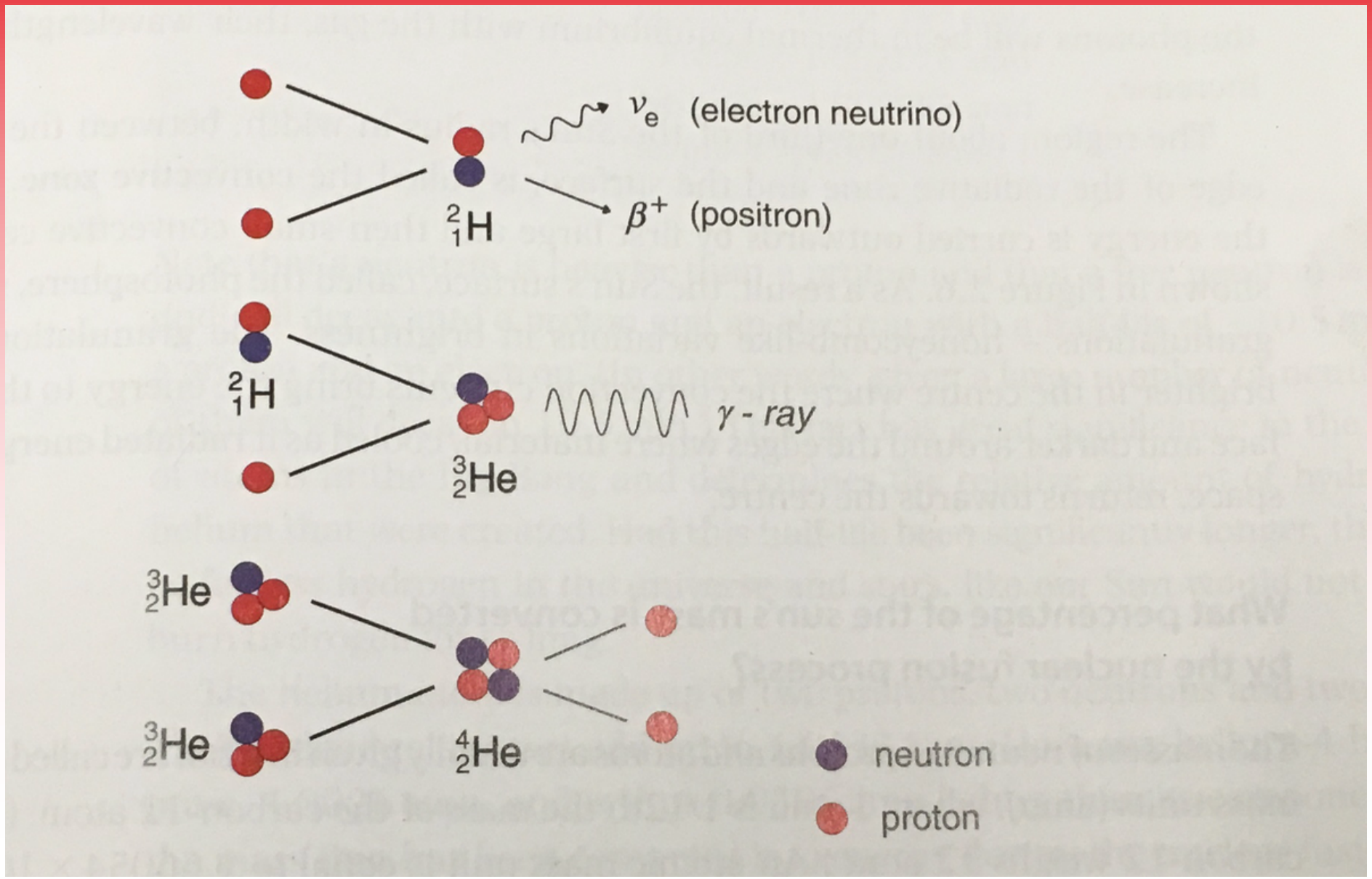


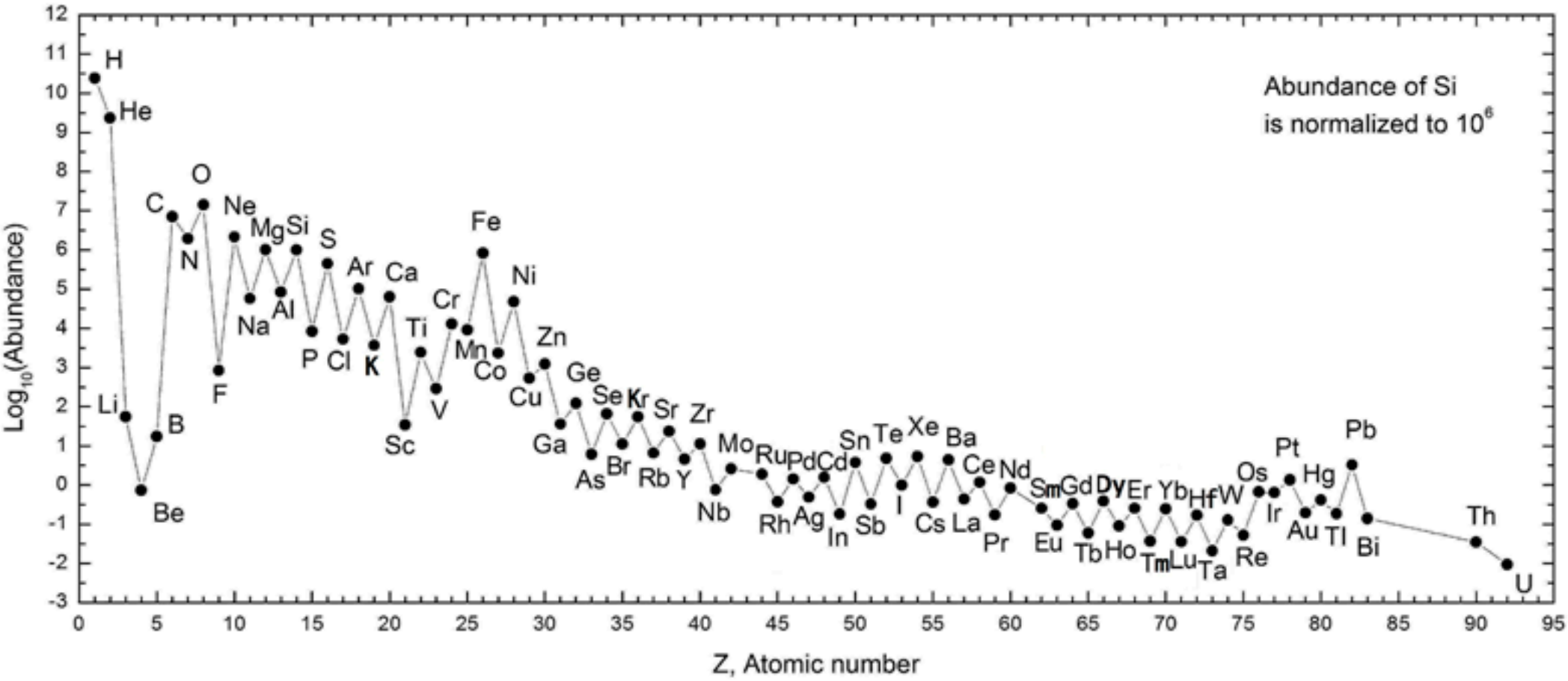
Table: Element Abundances



Element Abundances on Earth



Actual Steps of Fusion in the Sun



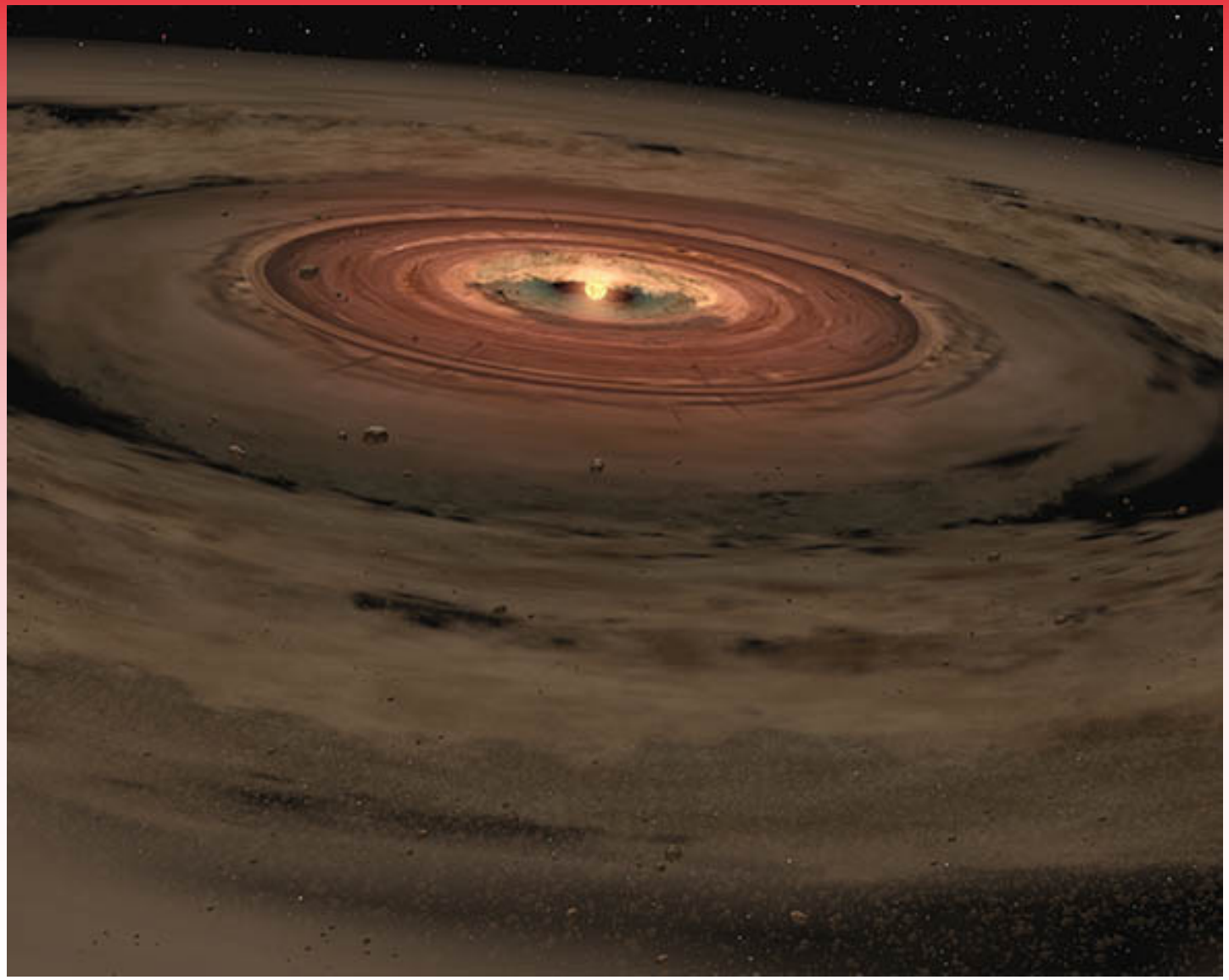
Note Regularity of Upticks

Carbon: 6 protons, 12 nucleons

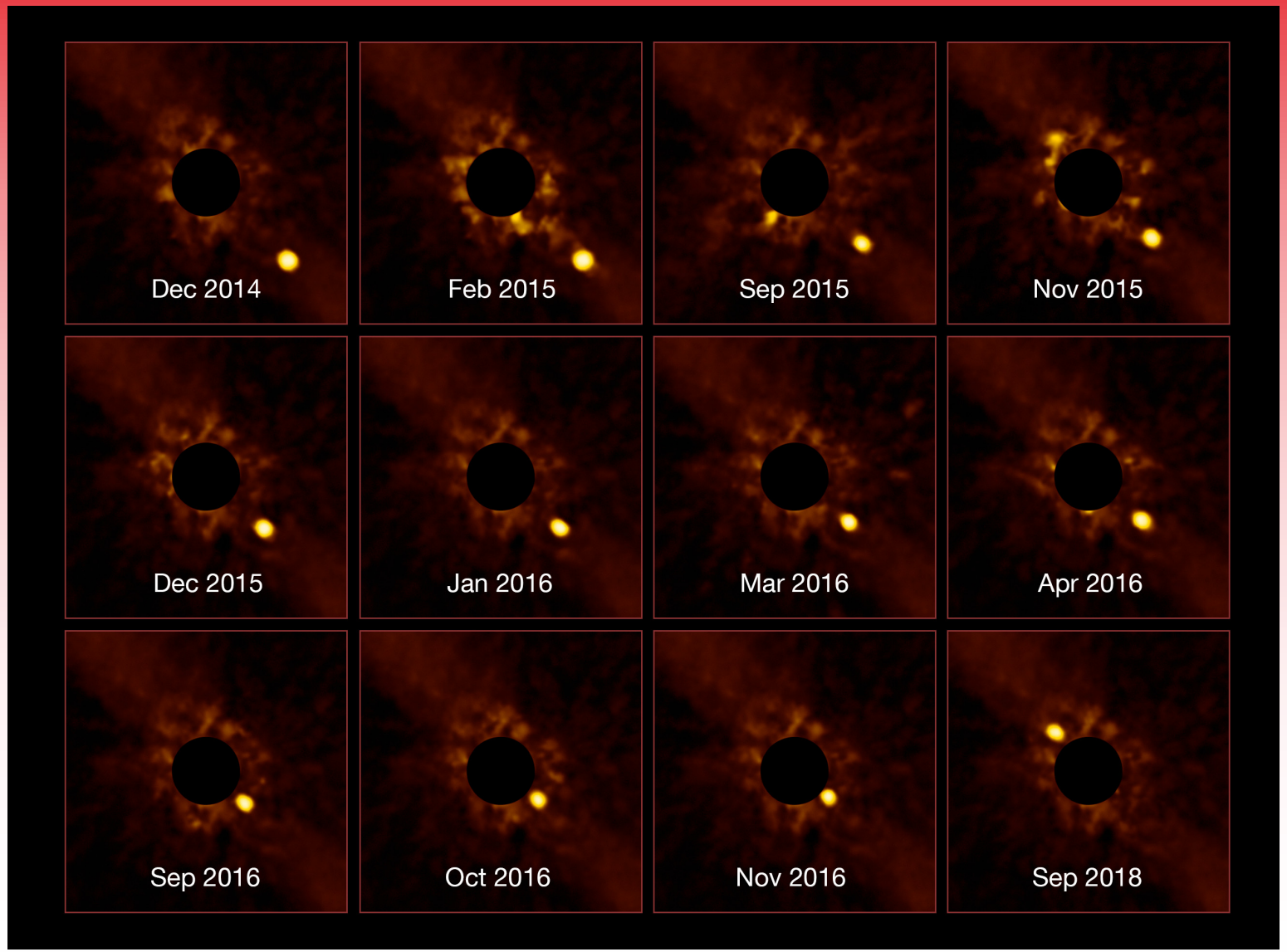
Oxygen: 8 protons, 16 nucleons

Neon, 10 protons, 20 nucleons

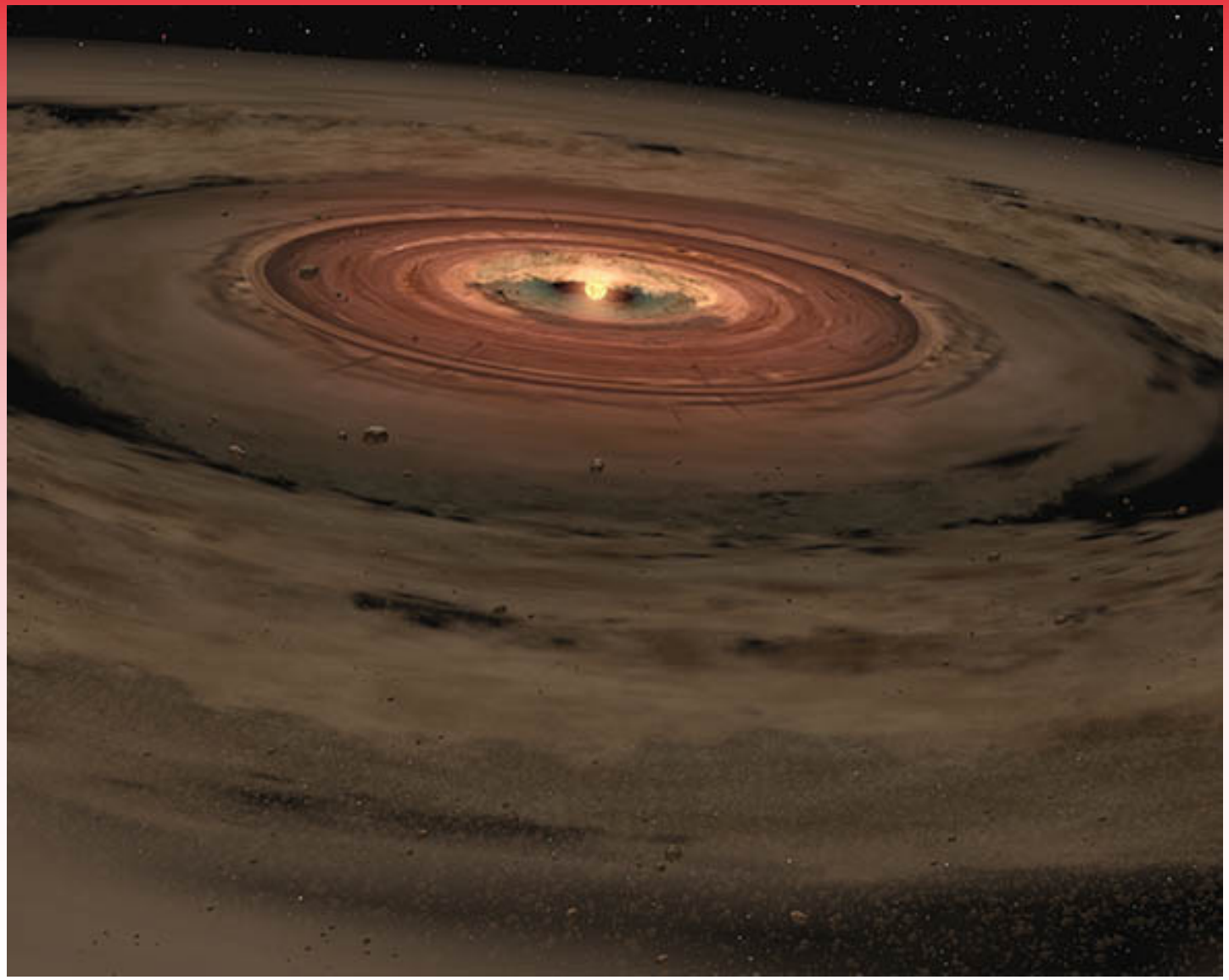
Magnesium, 12 protons, Silicon, 14 protons



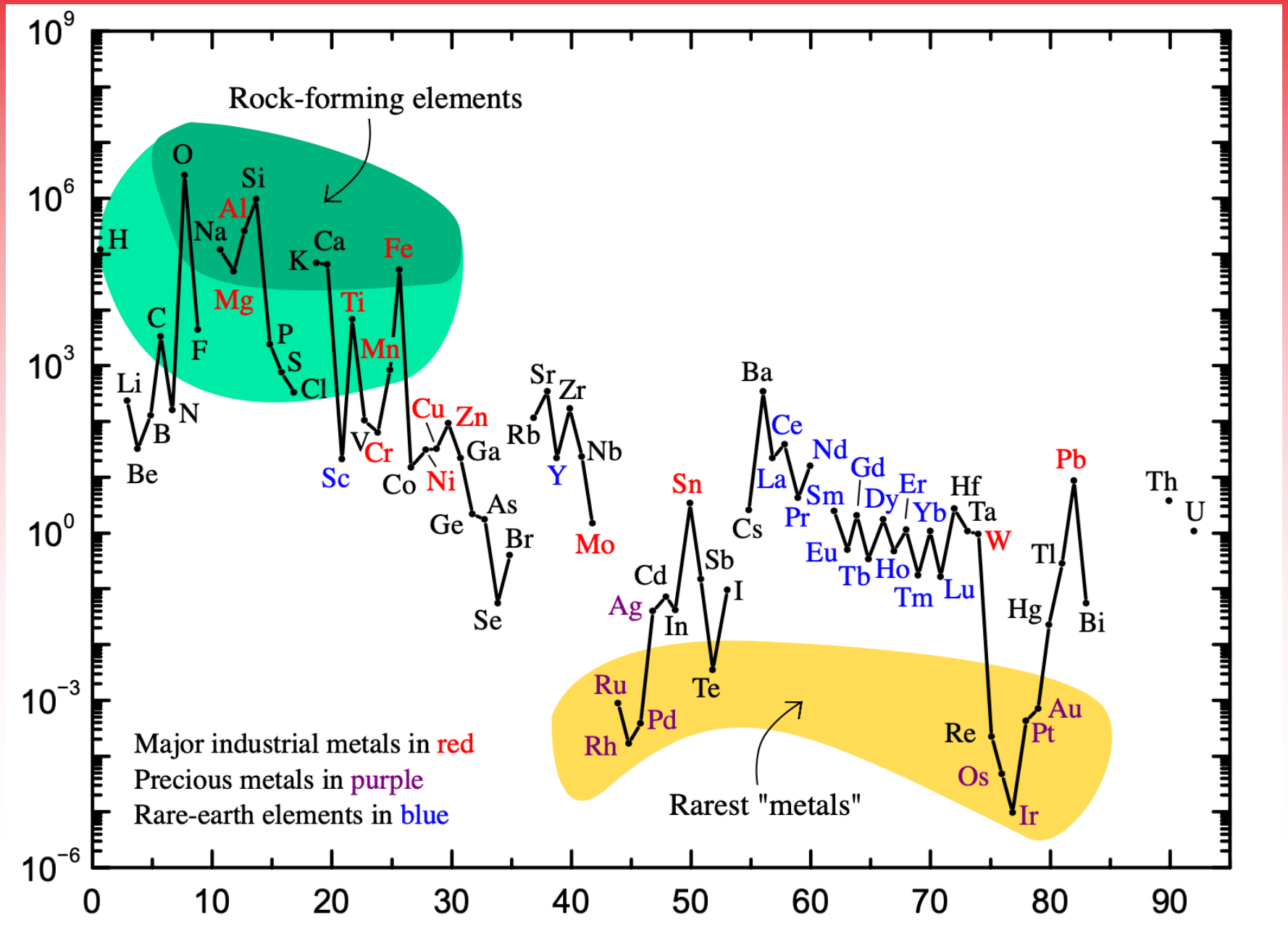
Artist's Concept: Disk Formation



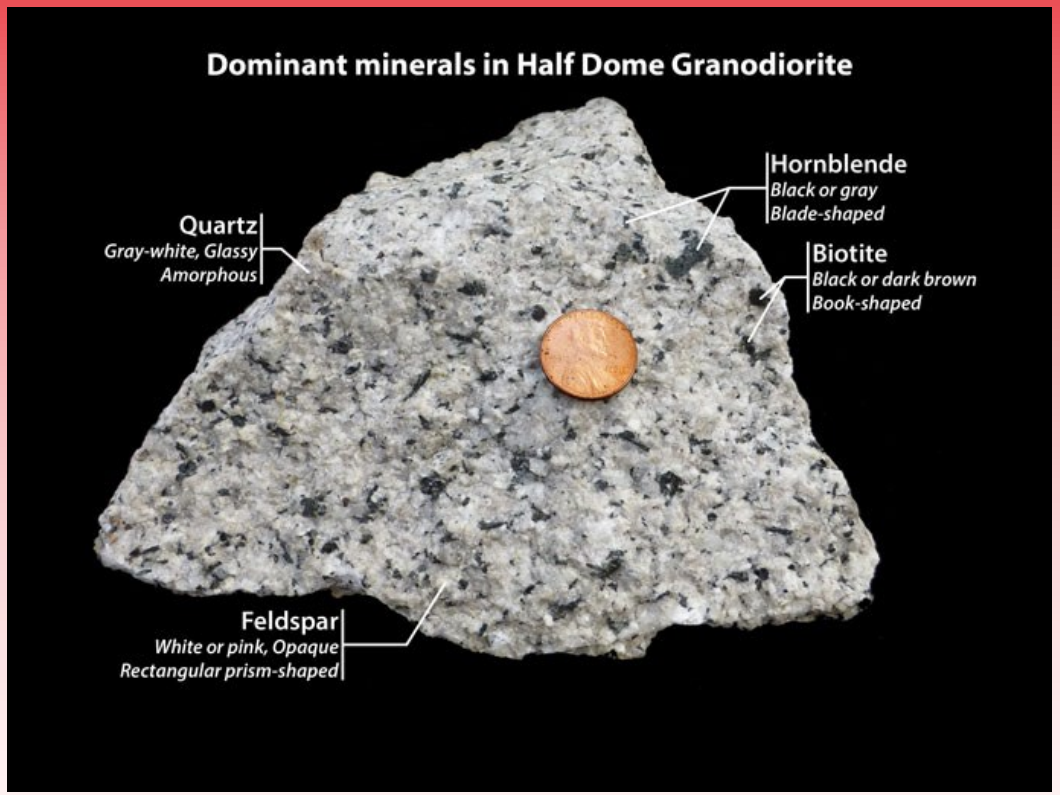
Exoplanet at Saturn Distance from its Star



Rotating Disk Flattens, Star Ignites



Element Abundances on Earth



What is Half-Dome?

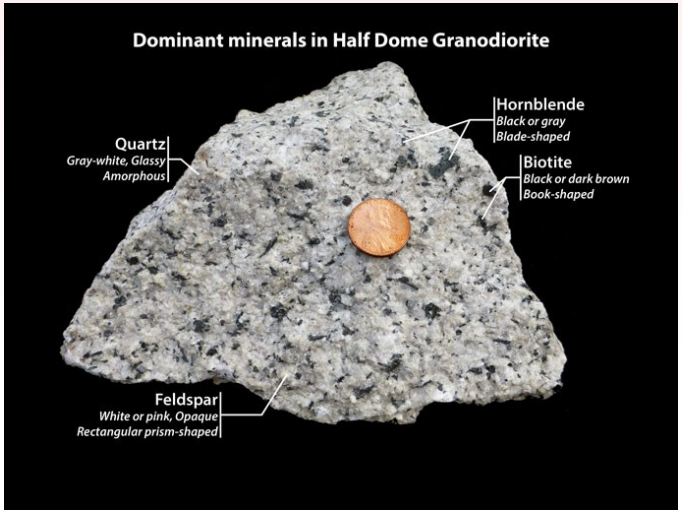
Granite (Granodiorite):
Quartz, Hornblende, Biotite,
Feldspar, etc., etc.

What is Quartz?

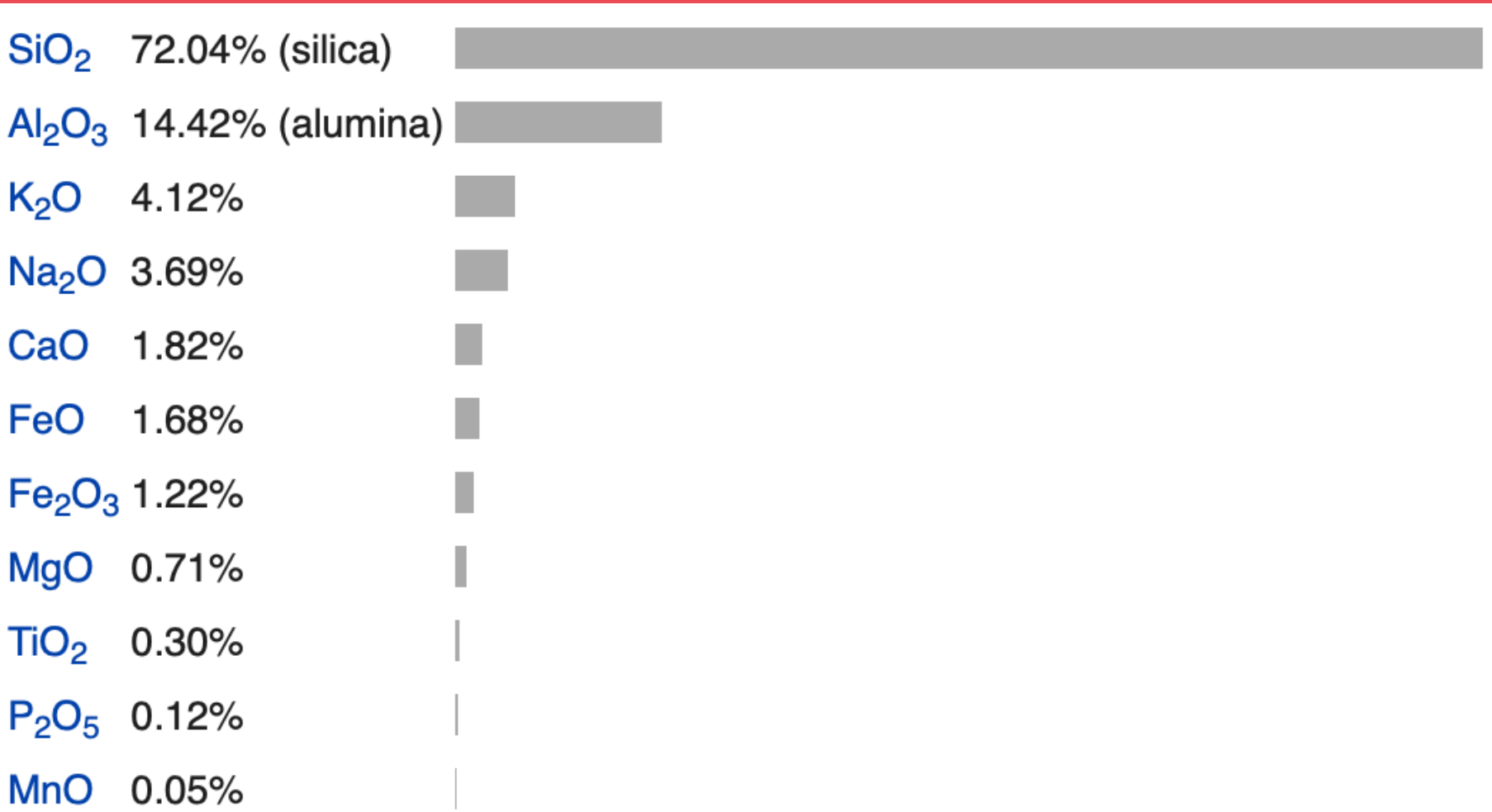
$Si O_2$

A chemical compound

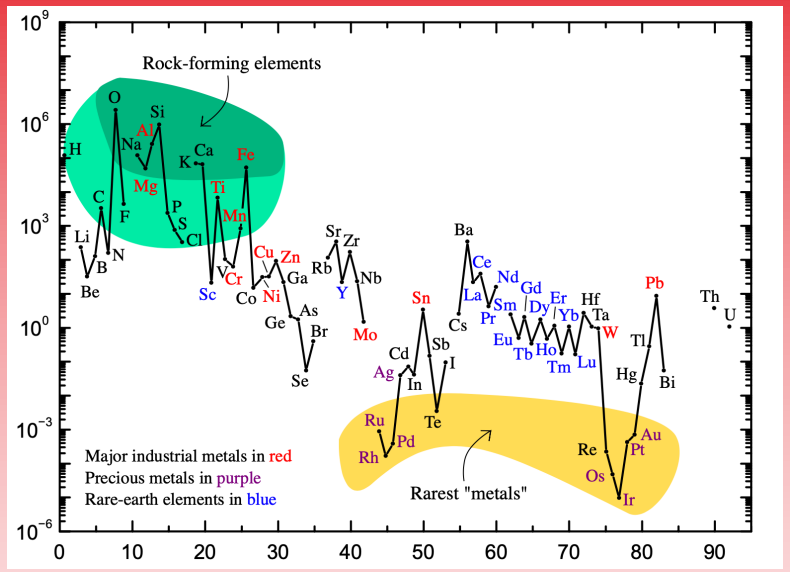
of Silicon and Oxygen

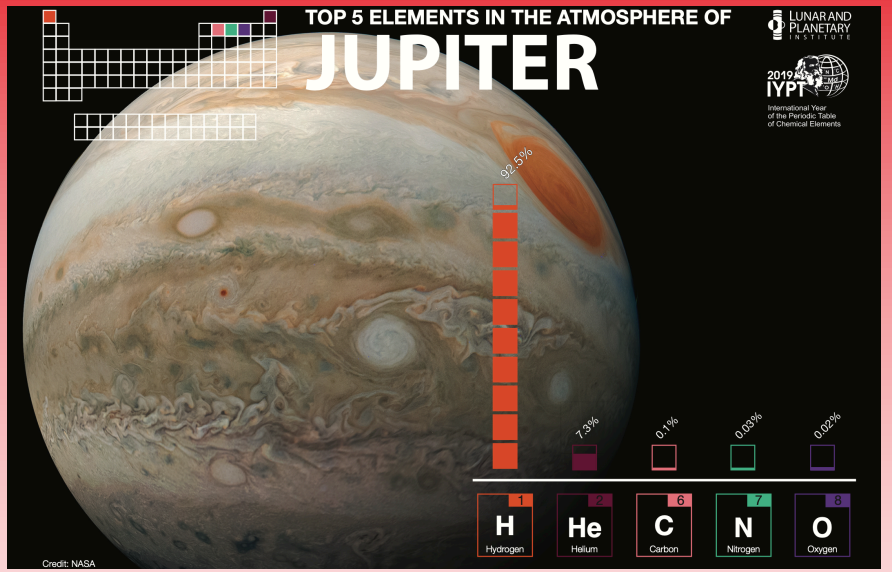


What is Granite, Chemically?



Average Chemical Composition
(Thousands of Granite Samples)





Summary, Takeaway

4 Rocky Planets (Mercury, Venus, Earth, Mars)

Dominated by Rock-Forming Elements

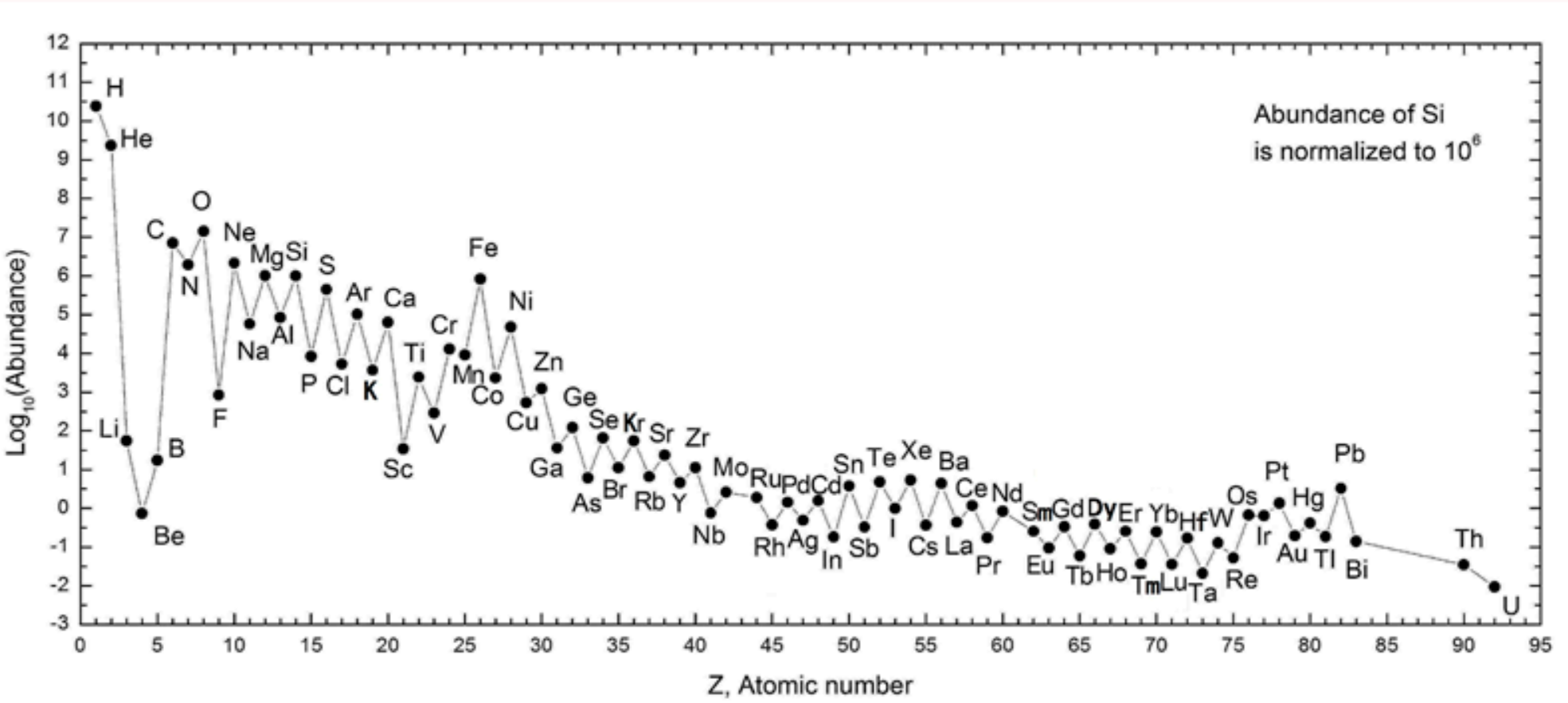
4 Gaseous Planets (Jupiter, Saturn, Uranus, Neptune)

Dominated by Same Gases as Sun (Hydrogen, Helium)

Reason for Difference?

Light Gases Stripped from Rocky Planets, "Boiled Away"

Not Yet Explained!



How did we get these abundances?