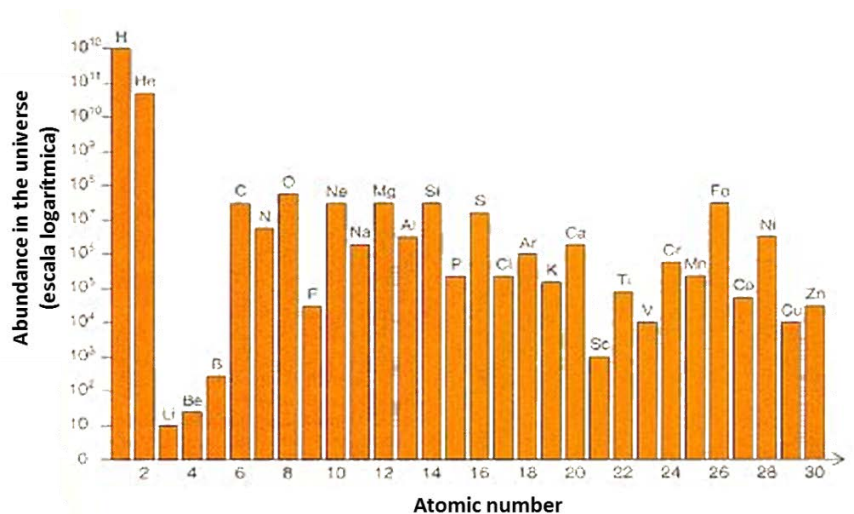


# HELIUM

## ATOMO DE HELIO (modelo Bohr)



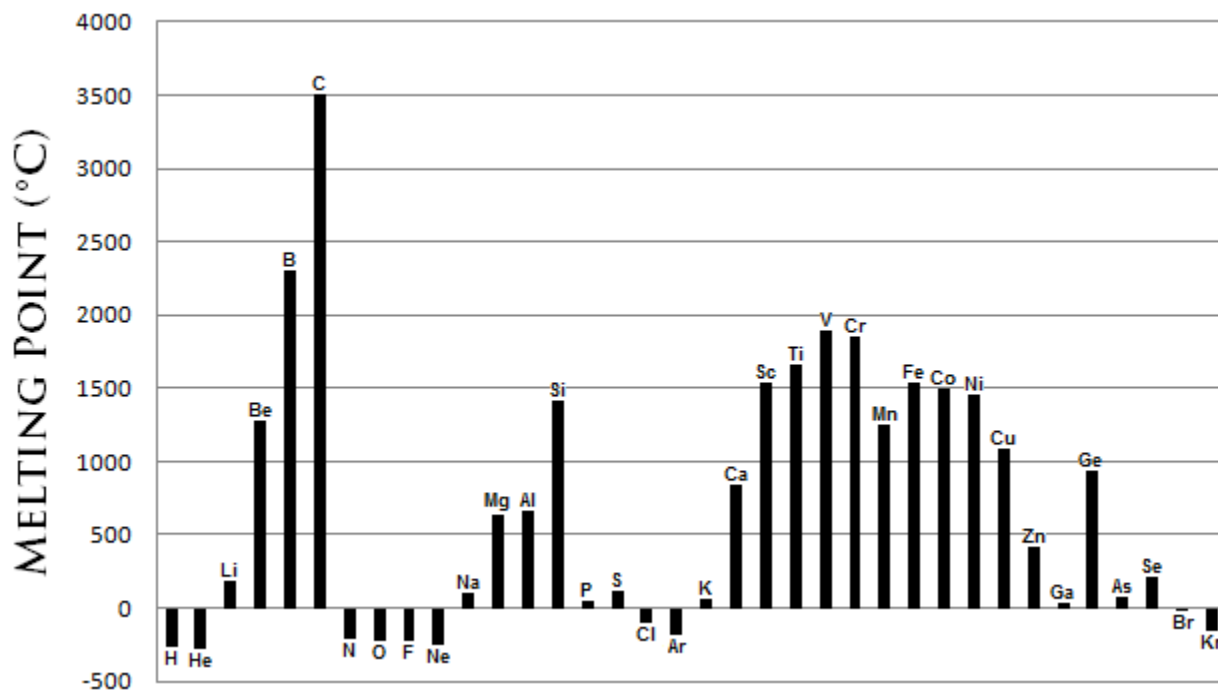
Helium is the chemical element with symbol “He” and atomic number 2. It is the second lightest element and the second most abundant element in the universe, representing 23% to 24% of the observable matter (almost all matter that is not hydrogen). Most of the helium is in the form of 4-helium isotope, which is identical in its core to the particle known as the “alpha particle”. Its abundance depends on the origin due to its formation process.



The nuclear arrangement of 4-Helium is highly energetic and extremely stable to all particles being the least reactive gas after neon.

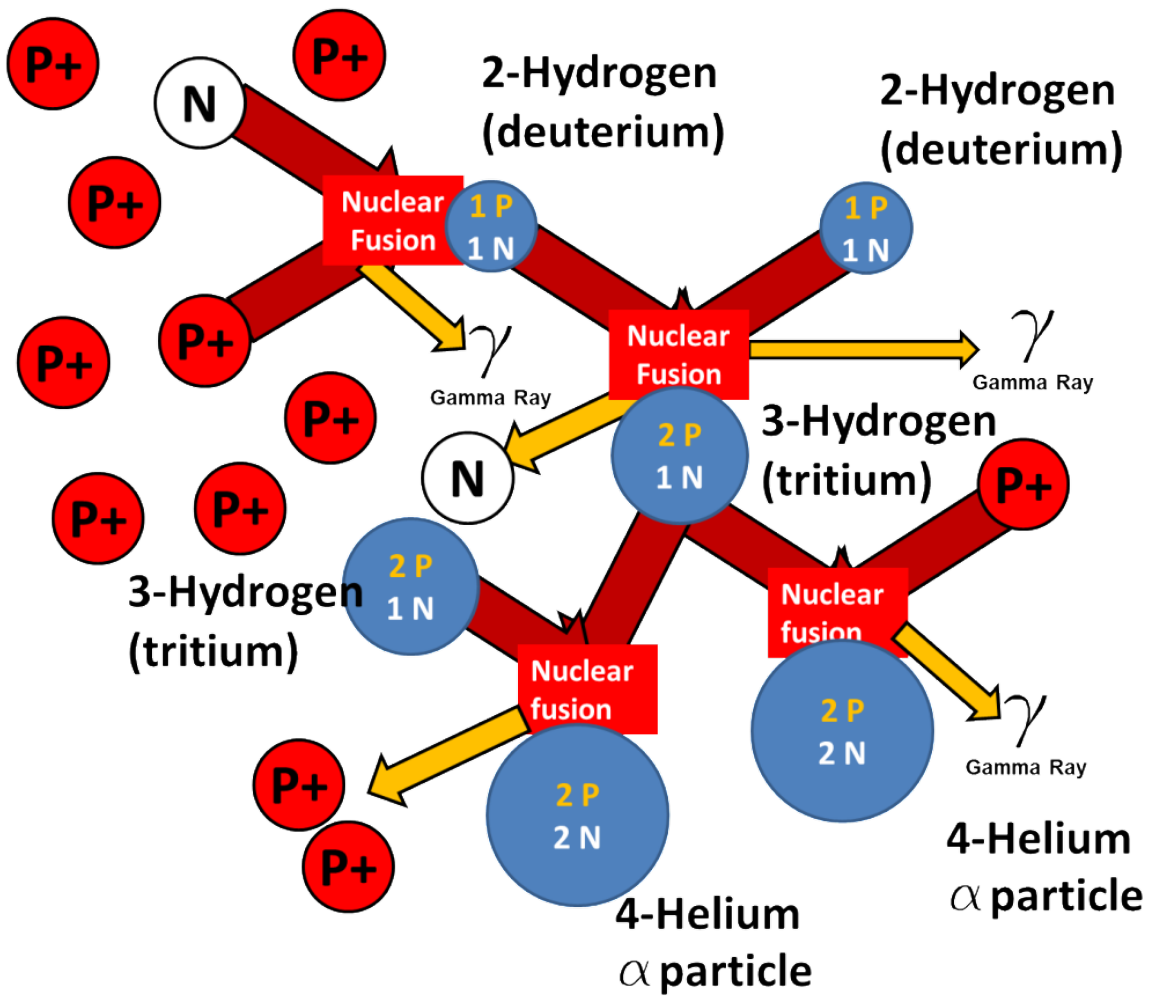


This makes the element inert and also due to the lack of interaction between the atoms of helium, it will have the lowest boiling points and melting points of all the elements.



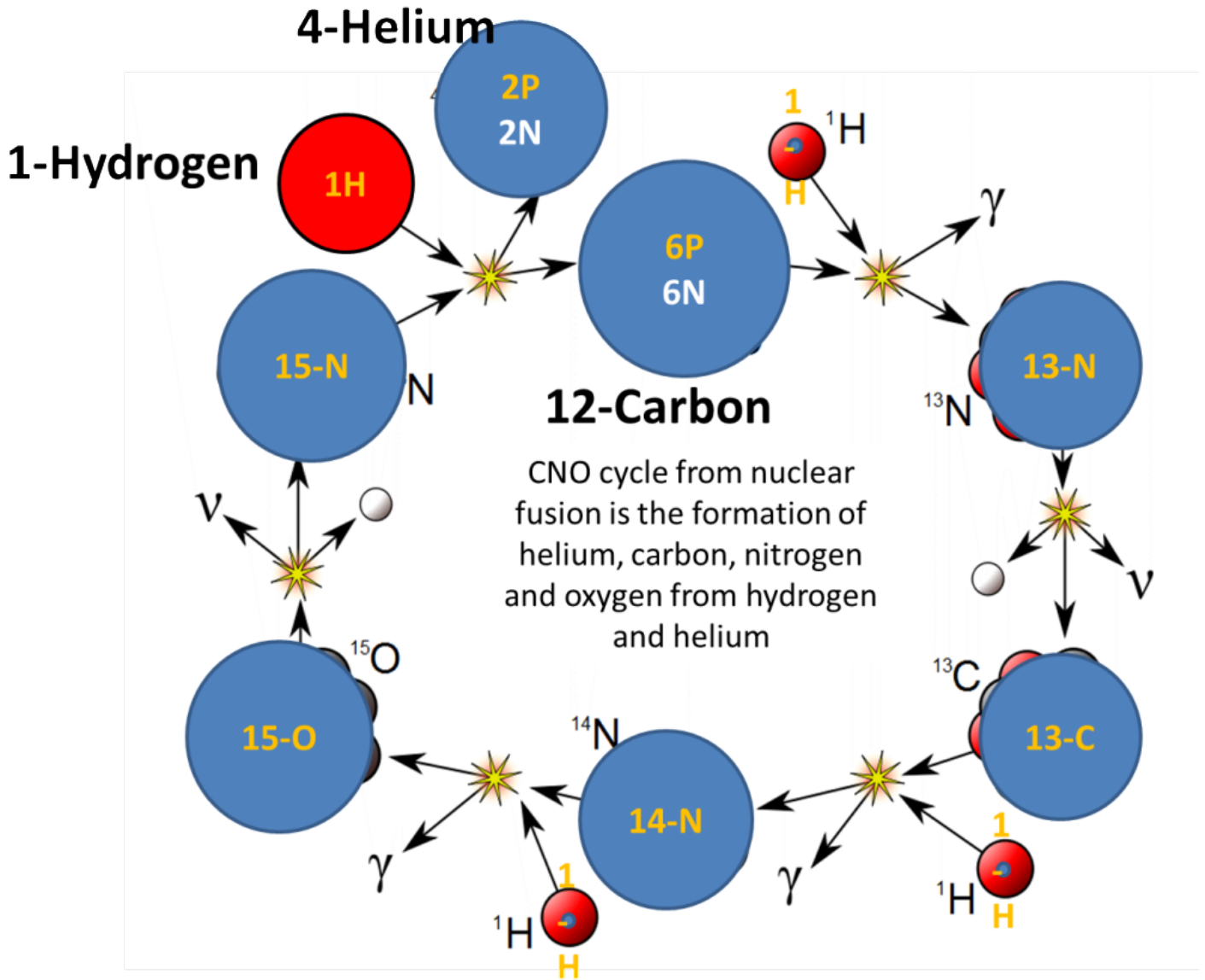
Due to its small size, the rate of diffusion of helium through solids is 3 times that of air and 65% of hydrogen.

Helium is believed to be formed during primordial nucleosynthesis, at 3 minutes and 45 seconds after the start of the universe when the universe expansion cooled enough to 1 billion of ° K and finally the 2-hydrogen isotopes could be formed initiating a rapid sequence of nuclear reactions into 3-Helium as raw material to finally integrating 4-helium. Some Helium is also created as a result of the nuclear fusion of hydrogen in stars.



The way how 4-Helium was formed captured the great majority of the neutrons in the universe leaving little for forming lithium, beryllium and boron. The formation of heavier elements and matter for rocky planets

like Earth, happened in stars hot enough to fuse helium inside them during the Carbon-Nitrogen and Oxygen (CNO) cycle.

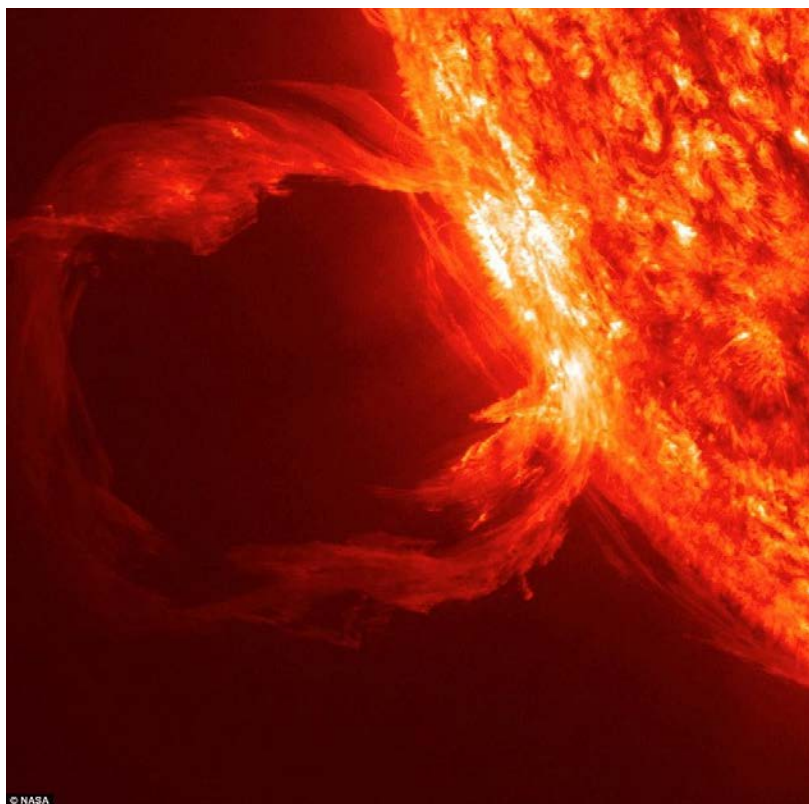


Its enormous abundance in stars like the sun and planets like Jupiter is due to the high binding energy of 4-Helium, which makes this element proliferate in nuclear fusion and in radioactive decay.

At ambient temperature and pressure of the earth, is a colorless, odorless, tasteless, inert, nontoxic and monatomic gas. Helium has the lowest boiling point (4.22 ° K) and lowest melting point of all existing elements and gas except in extreme conditions.

Most terrestrial helium is created by the natural radioactive decay of heavy radioactive elements such as thorium and uranium. Radiogenic helium is trapped in natural gas reservoirs in concentrations of up to 7% by volume.

Most of the helium out of the Earth is in the plasma state, with properties different than the atomic helium. In plasma, electrons from the helium are not attached to the nuclei, resulting in a very high electrical conductivity. The charged particles are highly influenced by electromagnetic fields. A normal pressures and absolute zero, helium remains liquid.



Below the boiling point of 4.22°K and above 2.17 °K, the 4-Helium exists in a colorless liquid called “Helium I” with a refractive index of 1.026 and a very hard surface, difficult to see, with a very low viscosity and density of 0.13 grams / milliliter.

As the temperature drops below 2.17 ° K, the helium is called “Helium II” and is in liquid state, having a very high thermal conductivity and the highest known thermal conductivity (1 million times the Helium I) . If it flows through capillaries as thin as 10<sup>-7</sup> to 10<sup>-8</sup> it will not have a measurable viscosity but moving between two discs in motion, there was found a viscosity comparable to helium gas.

Helium II thermal conductivity is one million times higher than helium I and hundreds of times higher than copper. This is because the heat conduction is typically done through a valence band of free electrons, however helium II has no such band. Helium II at 1.8 ° K transports heat at 20 meters per second, similar to the speed of sound.

There are eight known isotopes of helium, but only 3-Helium and 4-Helium Helium are stable. On Earth, 3-Helium is present only in traces, mostly since the formation of the Earth. Helium has a valence of zero and is chemically non-reactive under normal conditions and is an electrical insulator unless ionized.

Source : <http://www.artinaid.com/2013/04/helium/>