

## Atom

Atom is a small particle, constituted by three subatomic particles: proton, neutron and electron.

Proton is a particle with positive charge, neutron is a neutral particle without charge. Proton and neutron are present in the nucleus in the centre of the atom.

Electron is a smaller particle than neutron or proton (about 1.836 times). It has a negative charge and it runs around nucleus.

Nucleus contains all the positive charge of the atom and about all the mass. Nucleus diameter is three thousand times smaller than atom's diameter and the electrons run around the nucleus, with a speed near the light speed, in a very large space producing a strong electromagnetic field that makes atoms impenetrable.

Electrons run around nucleus along on special trajectories called orbitals.

In the ground orbitals (ground state) electrons can run without absorbing or emitting energy, but electrons may receive energy in many ways and pass in another orbitals called excited orbitals.

When electrons do not have more energy they return to the ground state emitting energy under the shape of electromagnetic wave (foton).

Electrons absorb and emit energy in particular quantities, these quantities are called quantized.

Atoms are also called elements because they are the elements of the periodic table, a table that classifies atoms according to their chemical properties.

In the periodic table of the elements atoms are numbered by the atomic number ( $Z$ ) that is the number of protons of the elements.

The atomic number identifies the element, for example, an element with a atomic number one ( $Z = 1$ ) is hydrogen, with  $Z = 2$  is helium,  $Z = 3$  lithium etc.

The number of atomic mass ( $A$ ), or mass number, is the total number of nucleons (protons and neutrons).

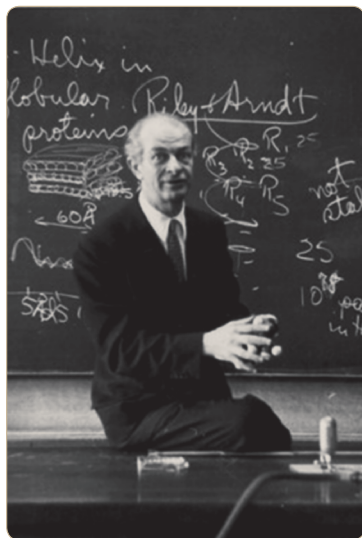
Atoms of the same element do not always have the same mass number: hydrogen for example, can have three different atomic masses. Hydrogen with mass number one ( $A = 1$ ) is called hydrogen, hydrogen with  $A = 2$  is called deuterium, hydrogen with  $A = 3$  tritium. These atoms are called isotopes.

(Adapted from Wikipedia)

## Linus Pauling's biography

Linus Carl Pauling was born in Portland, Oregon, on 28th February, 1901, the son of a druggist of English-Scottish ancestry.

Linus attended the public elementary and high schools in the town of Condon and the city of Portland, Oregon, and entered the Oregon State College in 1917, receiving the degree in chemical engineering in 1922.



Linus Pauling

During the years 1919-1920 he served as a full-time teacher of quantitative analysis in the State College, after which he was appointed a Teaching Fellow in Chemistry in the California Institute of Technology.

Since 1919 his interest lay in the field of molecular structure and the nature of the chemical bond, on the application of the Lewis theory of the sharing of pairs of electrons between atoms to many substances.

In 1954 for his theory about chemical bond he was awarded the Nobel Chemistry Prize, and in 1962 for his strong commitment against the nuclear weapons he was awarded the Nobel Peace Prize.

Pauling is a member of numerous professional societies in the U.S.A. as well as in many European countries, India, Japan and Chile. Awards, medals, and honorary degrees were showered upon him in America and Europe, and in addition he was elected Rationalist of the Year for 1960 and Humanist of the Year for 1961.

The subjects of the papers he published reflect his great scientific versatility: about 350 publications in the fields of experimental determinations about the nature of the chemical bond.

Linus Pauling died on August 19, 1994.

## Practise

Match the words in table A with the English equivalent in table B. Use a dictionary if needed.

Table A

A	Energia di legame
B	Legame doppio
C	Ottetto
D	Lunghezza di legame
E	Angolo di legame
F	Legame omeopolare
G	Legame eteropolare
H	Legame covalente
I	Legame ionico
J	Legame dativo
K	Orbitali molecolari
L	Legame idrogeno
M	Legame metallico
N	Teoria del legame di valenza
O	Forma
P	Reticolo
Q	Orbitali atomici
R	Distribuzione
S	Guscio esterno
T	Guscio nobili

Table B

1	Lattice
2	Homopolar bond
3	Valence bond theory
4	Bond length
5	Atomic orbitals
6	Heteropolar bond
7	Metallic bond
8	Octet
9	Sharing
10	Covalent bond
11	Hydrogen bond
12	Double bond
13	Valence shell
14	Ionic bond
15	Binding energy
16	Noble gas
17	Shape
18	Bond angle
19	Molecular orbitals
20	Dative bond

## Keys

Match the words in table A with the English equivalent in table B. Use a dictionary if needed.

**Table A**

A
B
C
D
E
F
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P
Q
R
S
T

**Table B**

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