

All atoms except hydrogen are formed in stars: fusion in core, in nova events

Atoms extremely small—smaller than wavelengths of visible light

Elements are substances composed of a single type of atom—

about 115 known, some are synthetic

atomic symbol has a capital letter, and some also have small letter

Formed of subatomic particles: proton, electron, neutron

Protons: positive charge, 1 atomic mass unit

Atomic number is the number of protons, identifies the element

Electrons: negative charge, 1/1841 of an atomic mass unit (negligible)

Neutrons have mass but no charge

Nucleus is made of protons and neutrons, surrounded by electron cloud

Mostly empty space: the electron cloud

electrons are negative, repel other atoms' electrons, so they don't pass through one another

Isotopes: same element with differing mass

Protons: atomic number, constant for substance

Neutrons: no set number,

Mass = protons + neutrons = mass NUMBER

Atomic MASS on periodic table is average mass of collective isotopes

C mostly 12,

N mostly 14,

Cl divided between 35 and 37 at 3:1 ratio

Periodic table:

Metals: shiny opaque, ductile malleable conductors

Nonmetals: poor conductors, may be transparent, brittle

Metalloids: intermediate properties

Periods: properties change across row gradually, repeat changes in next period

Interact electrically: lose, gain, share electrons—number lost or gained is the strength of their charge, their valence

Groups have similar properties

Alkali: mix with water make grease remover, soap

Alkali earth: also above, and don't degrade with fire

Chalcogens: ore makers—Oxygen, sulfur (also known as oxygen group)

Halogens: salt makers

Transition metals: harder, less reactive than alkalis

Inner transition metals: hard to separate, so chemically similar

Noble gases: non-reactive

Electrons travel in waves around atoms—certain locations due to wave lengths

Electron Shell model of atoms

Periodic table arranged by electron shells—

build from inner shells to outer ones

Outer electrons interact with other atoms: valence electrons

same group have same # of valence electrons in outermost shell

greater numbered periods have larger shells, can hold more electrons