

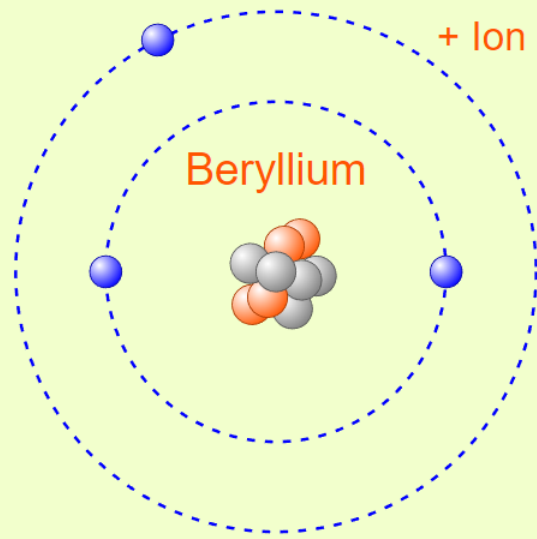
Isotopes and radioactive decay



THE FLORIDA STATE UNIVERSITY

What do the symbols used for an isotope mean?

Protons: ●●●●●
Neutrons: ●●●●●
Electrons: ●●●●●



Protons Neutrons Electrons

Element [-]

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og

Symbol [-]

9 +1

Be

4

Show

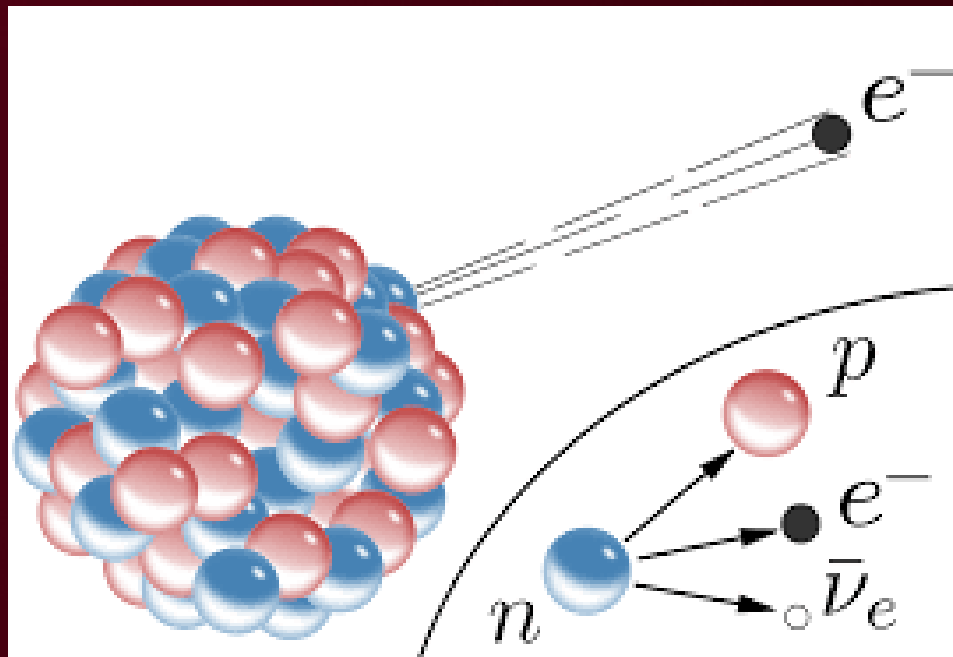
Element

Neutral/Ion

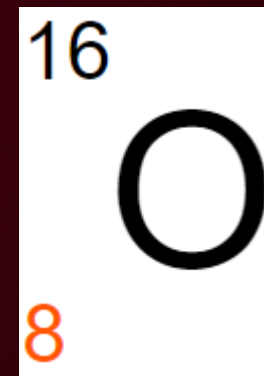
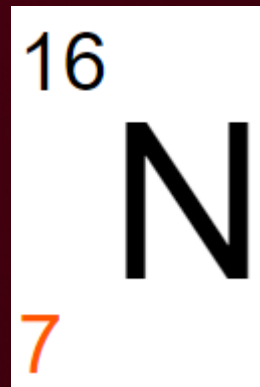
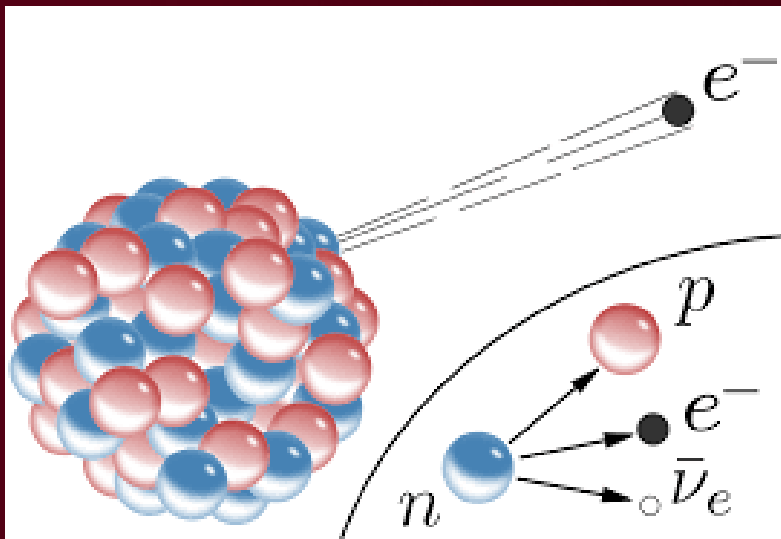
Stable/Unstable



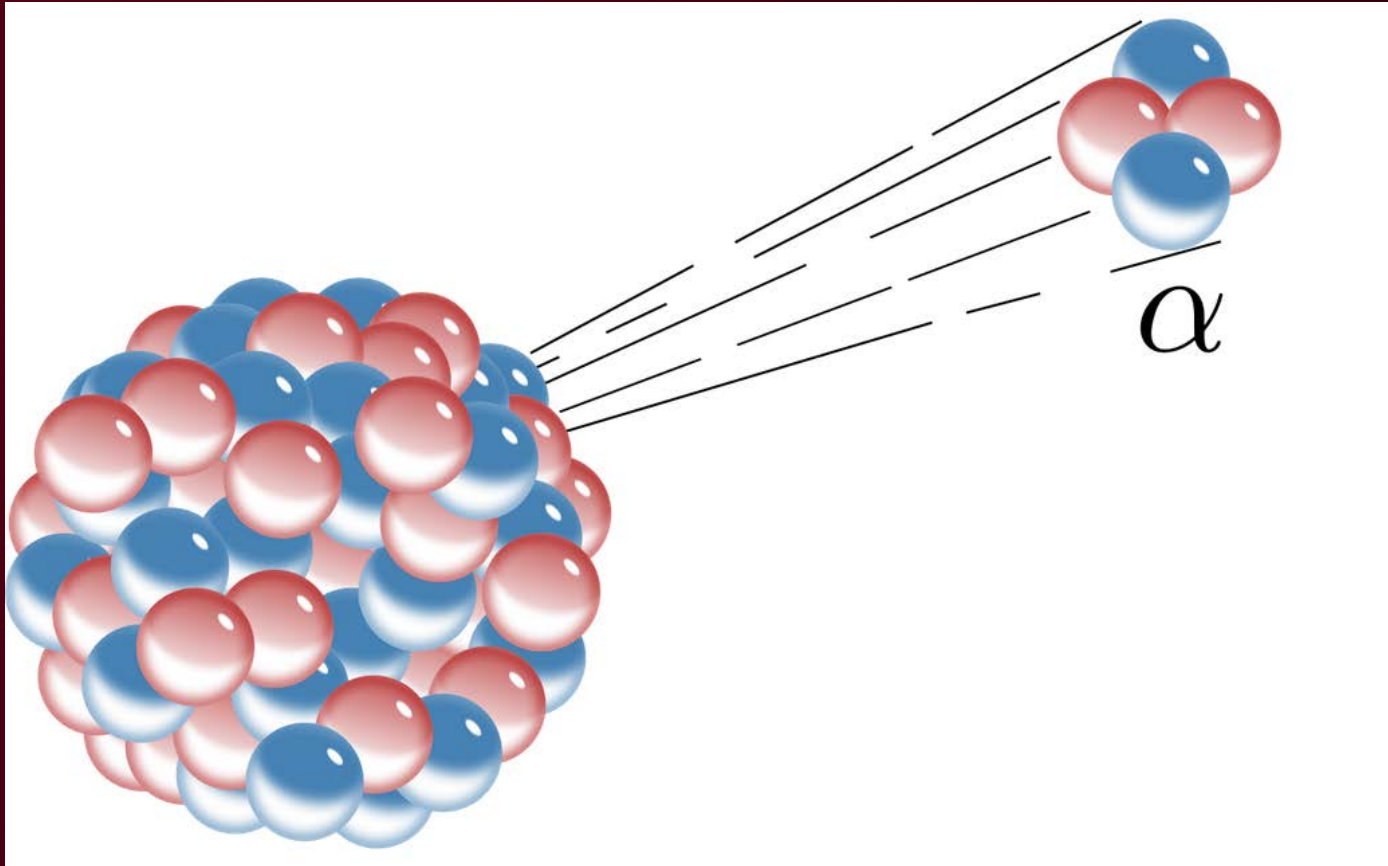
In beta-decay, a neutron in the nucleus decays into three particles – a proton, an electron, and a ghostly particle called a neutrino.



Beta-decay



In alpha-decay, a Helium-4 nucleus is removed from the nucleus.



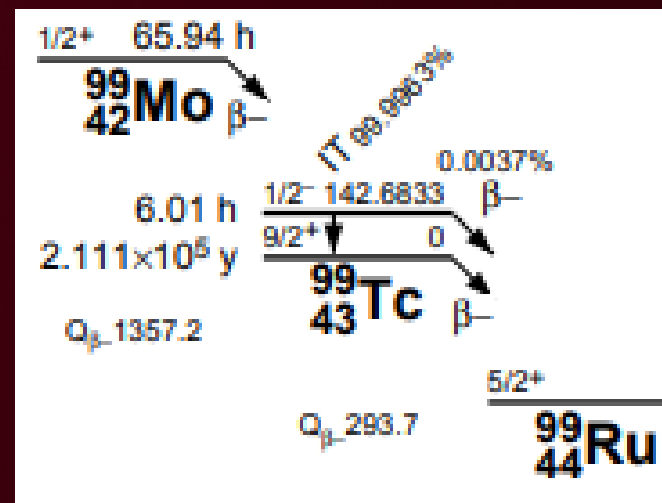
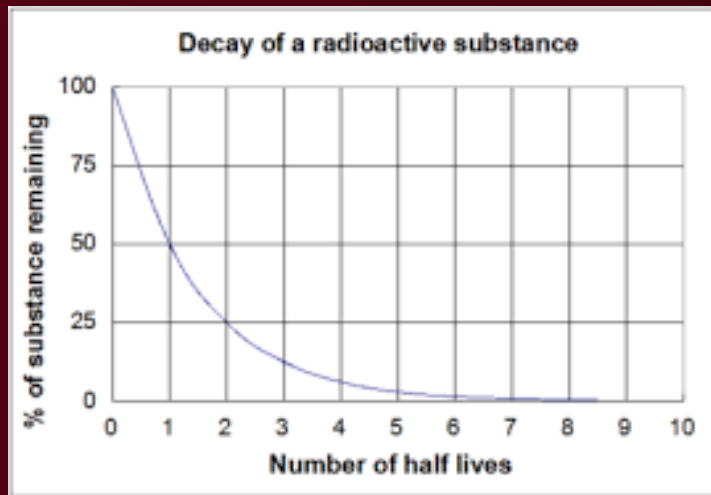
In alpha-decay, a Helium-4 nucleus is removed from the nucleus.



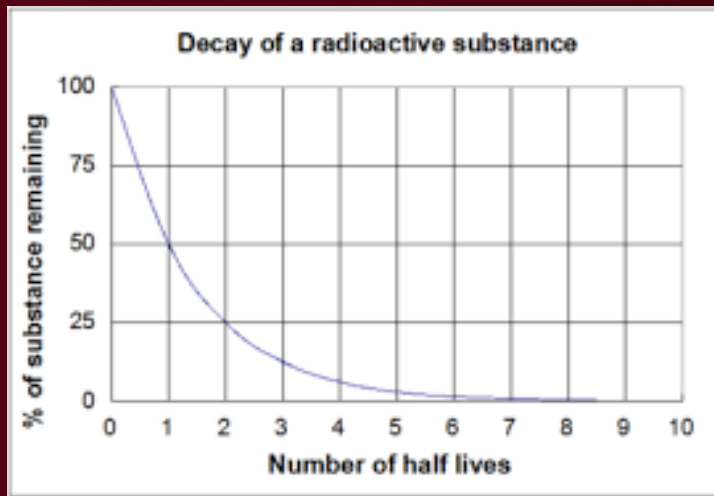
(210) 812.1 2.00 Po Polonium [Xe] 4f ¹⁴ 5d ¹⁰ 6s ² 6p ⁴	84 +6 +4 +2 -2	(210) 890.0 2.20 At Astatine [Xe] 4f ¹⁴ 5d ¹⁰ 6s ² 6p ⁵	85 +1 -1	(220) 1037.0 Rn Radon [Xe] 4f ¹⁴ 5d ¹⁰ 6s ² 6p ⁶	86
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Half-life

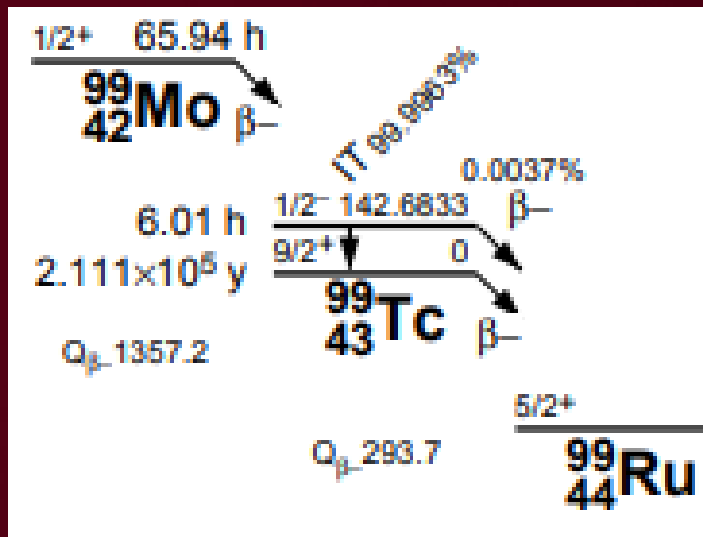


Half-life



$$N = N_0 \left(\frac{1}{2}\right)^{[(\text{time})/(\text{half-life})]}$$





How much of the ^{99}Mo produced in the Netherlands radioactively decays during an 8-hour flight from Amsterdam to Atlanta?

$$N = N_0 (1/2)^{[(\text{time})/(\text{half-life})]}$$

$$N/N_0 = (1/2)^{[(8 \text{ hr})/(65.94 \text{ hr})]} = .919$$

So 8.1% loss.

