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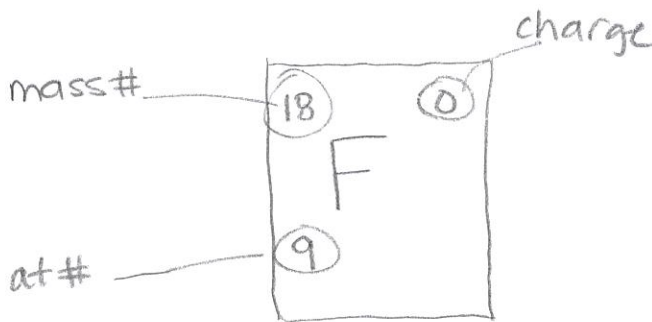
DATE: Wed, Nov 10, 2021

TOPIC: Atomic Structure & Properties

ESSENTIAL QUESTION: What is the structure of the atom in terms of subatomic particles and their properties? (Obj 1) How do you distinguish the uniqueness of atoms in terms of at. #, mass# & isotopes? (Obj 2) What are the forces that bind the atom together? (Obj 3)

QUESTIONS AND CONNECTIONS:

NOTES:



Atom: smallest part of an element that still retains the prop. of that element

Subatomic Part.	mass	charge	location	Affects what?
Proton	1amu	+1	nucleus	determines element (atomic #)
Neutron	1amu	0	nucleus	mass (isotope) stability
Electron	0amu	-1	outside nucleus	charge (ion)

Ion: charged atom EX: Nitrogen-always $7p^+$
 → cation is pos. - if neutral $\Rightarrow 7e^-$
 → anion is neg. - if ion $N^{3-} \Rightarrow 10e^-$
 *atom becomes charged by gaining or losing e^-

Isotope: same element, diff # $n^0 \Rightarrow$ diff mass

EX: C-12, C-14 U-238, U-235
 most used in most stable used in
 abund. dating but decays nuclear reactors

<u>Atomic Mass</u>	vs.	<u>Mass #</u>
avg of isotopes found in nature		$p^+ + n^0$ (round to nearest whole #)
EX: 12.011		EX: C-12

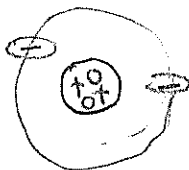
Atomic Forces

QUESTIONS AND CONNECTIONS:

p. 308-9

NOTES:What holds the atom together?

- ① Electric Force: charges $\rightarrow +$ or $-$
 - like charges repel, opp. attract

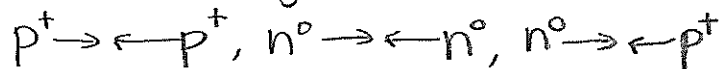


pos. nucleus attracts neg. electrons

* Coulomb's Law: $F_{\text{elect}} = \frac{|q_1||q_2|}{r^2}$

much like law of grav. - r^2 \uparrow charge = \uparrow electric F \uparrow dist = \downarrow electric F

- ② Strong Nuclear Force: short-range,
very strong attractive force that holds
 the nucleus together



* 100 x stronger than electric force

Small vs. Large Atomssm \rightarrow fewer p^+ , sm elect. F, same strong F, atom held tightly togetherlg \rightarrow more p^+ , lg elect. F, same strong F, atom held loosely togetherwhen strong F keeps nucleus together \Rightarrow

STABLE

SUMMARY:When strong F can't keep nucleus together \Rightarrow

UNSTABLE

\hookrightarrow Radioactive! Nucleus will decay & give off E via radioactivity.

- All elem. w/more than 82 p^+ = unstable &- All elem w/more than 92 p^+ radioactive

are synthetic & decay soon after they are created