CHEM 108

Atoms/Elements

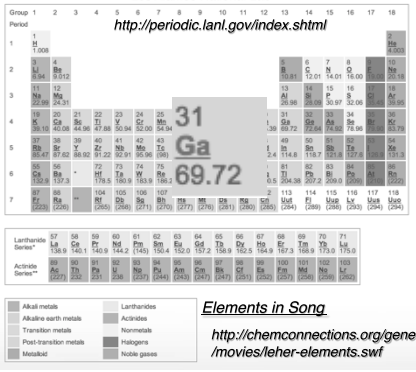
and

The Periodic Table

Periodic Table (August 2017)

Los Alamos National Lab

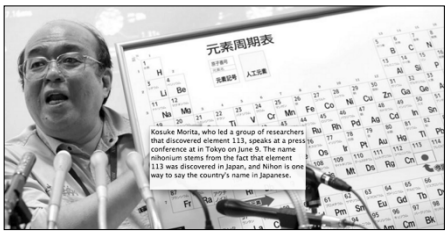
http://periodic.lanl.gov/index.shtml



Elements in Song

http://chemconnections.org/general/movies/leher-elements.swf

Scientists Name 4 New Elements
113, 115, 117 and 118
Completing the Periodic Table
(November, 2016)



Los Alamos National Laboratory Chemistry Division

Periodic Table of the Elements

Los Alamos NATIONAL LABORATORY CHEMISTRY

What are the names of elements 113, 115, 117 and 118?

Los Alamos National Laboratory Chemistry Division

Periodic Table of the Elements

113: Nihonium, 115: Moscovium , 117: Tennessine and 118: Oganesson

Los Alamos NATIONAL LABORATORY CHEMISTRY

What are the names of 113, 115, 117 and 118?

Los Alamos National Laboratory Chemistry Division

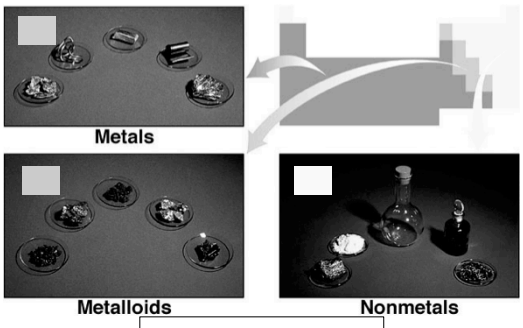
Periodic Table of the Elements

Los Alamos NATIONAL LABORATORY CHEMISTRY

element names in blue are liquids at room temperature
element names in red are gases at room temperature
element names in **black** are solids at room temperature

3/15/17

Metals, Metalloids, and Nonmetals



CHEMISTRY of the Atom

FUNDAMENTAL PARTICLES:

	Mass	Charge	Symbol
Nucleus:			
ð *PROTON*	*1 amu*	*+1*	H^+, *H, p*
	• *1.67 x 10 $^{-27}$ kg*		
ð *NEUTRON*	*1 amu*	*0*	*n*
	• *1.67 x 10 $^{-27}$ kg*		
ð *ELECTRON*	*very small*	*-1*	e^-
	• *≈ 2000 x smaller than a proton or neutron*		

*This particle is said to "hold" or "**bond**" atoms together in molecules.*

Modern Chronological History of the Atom

- ð *1909: Millikan determines charge and mass of e-*
- ð *1913-19: Rutherford & Bohr's atom; The proton.*
  http://www.yrbe.edu.on.ca/~mdhs/science/chemistry/ch2_2.htm
- ð *1926: Waves & Particles, Quantum Mechanics*
  http://chemed.chem.purdue.edu/genchem/history/schrodinger.html
- ð *1932: James Chadwick "discovers" the neutron*
  http://www.nmsi.ac.uk/on-line/electron/section3/1932a.html

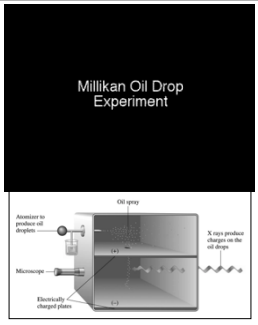
Modern History of the Atom

1897: J.J. Thomson "discovers" the electron:
http://www.nmsi.ac.uk/on-line/electron/section2/

Photo © The Nobel Foundation
http://pl.nobel.se/laureates/physics-1906-1-bio.html

Electron Mass & Charge

Milliken Oil Drop Experiment

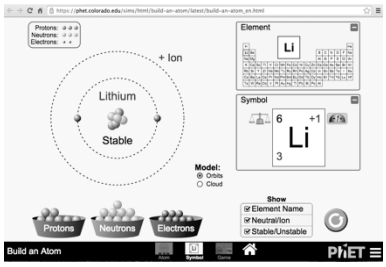


Modern History of the Atom

Ernest Rutherford (1871-1937)

CHEMISTRY of the Atom

https://phet.colorado.edu/sims/html/build-an-atom/latest/build-an-atom_en.html



CHEMISTRY of the Atom

ð *Periodic Table Atoms*

- *Atomic Number = # Protons*

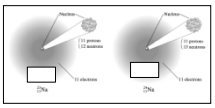
3
Li
6.941

- *Atomic Mass = # Protons + # of Neutrons*

CHEMISTRY of the Atom

ð *Atoms (neutral electrostatic charge: # protons = # electrons)*

- *# Protons = Atomic Number*
- *Atomic Mass = # Protons + # of Neutrons*
- *Isotope: same atomic number but different atomic mass (different # of neutrons)*



QUESTION

Which among the following represent a set of isotopes? Atomic nuclei containing:

a. 20 protons and 20 neutrons.
b. 21 protons and 19 neutrons.
c. 22 neutrons and 18 protons.
d. 20 protons and 22 neutrons.
e. 21 protons and 20 neutrons.

A. a, b, c
B. c, d
C. a, e
D. a, d and b, e
E. No isotopes are indicated.