Announcements

Wednesday, February 11, 2009

- Ch 4 MasteringChemistry due before class today.
- Ch 5 MC due next week **Tues**, Feb 17 9:45 am.

No class Monday (President's day)

Exam 1 is next week Wed, Feb 18 covering chapters 1-5 (through today's material - no polyatomic ions, only binary compounds).

- Mostly multiple choice, 25-30 mult choice q's
- 1-2 pages of short answer / show your work
- 100 points, 75 minutes
- Study guide will be posted on webpage later today

Optional study/review sessions in lab next week:

- Tues 8am, 1pm, Wed 8am

For practice:

- Practice worksheets on webpage (unit conversion, density, binary naming)
- End-of-chapter problems (odd # answers in back of book)
- Rework MasteringChemistry problems for practice
- Practice multiple choice exams from U of M (they cover through ch 6 on their exam 1)

If you're having trouble:

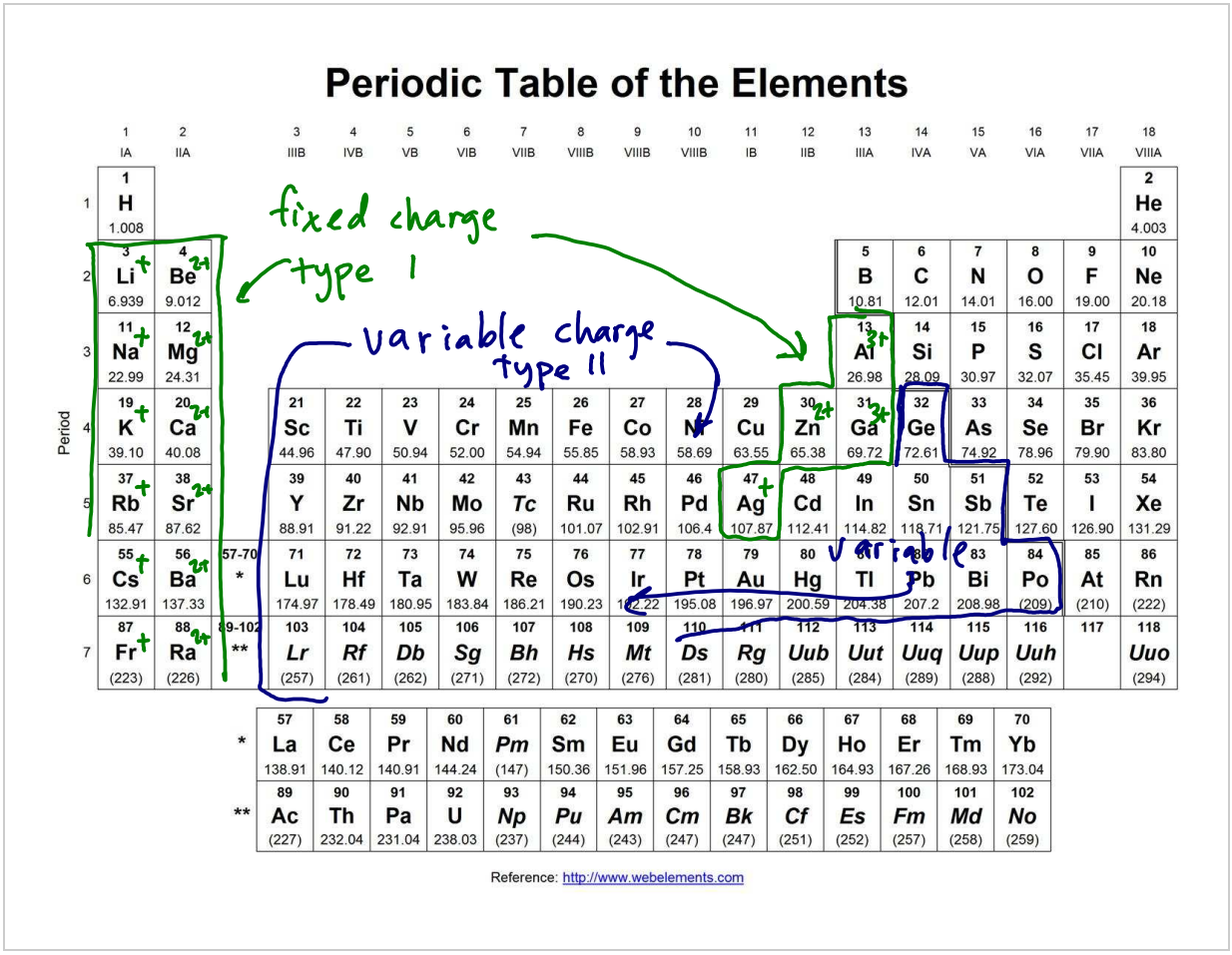
- See me during my office hours
- See a tutor in the academic support center - bring a problem you're having trouble with
- Work with a friend or study group
- Post a question to the D2L discussions (you need at least 2 posts in Exam 1 discussions before Exam 1)

Type I or Type II?

Type I: fixed charge metal
(most are main-group metals)

Type II: variable charge metal
(most are transition metals)

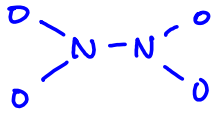
A few important exceptions...



ZnS Zn^{2+}/S^{2-} zinc sulfide PbO_2 Pb^{4+}/O^{2-} lead(IV) oxide

$GaBr_3$ Ga^{3+}/Br^- gallium bromide PbO Pb^{2+}/O^{2-} lead(II) oxide

Molecular compounds contain nonmetals only and have no ions!



Binary (2 element) molecular compounds are named from the formula using Greek prefixes to show quantity

NO_3: nitrogen trioxide

N_2O_4: dinitrogen tetroxide (avoid ao, oo)

CO_2: carbon dioxide

NO_2: nitrogen dioxide

CO: carbon monoxide

P_2Cl_5: diphosphorus pentachloride

memorize

Greek prefixes (for quantity)

1: mono (only for 2nd element)
2: di
3: tri
4: tetra
5: penta
6: hexa

Binary nomenclature practice

Do you know the difference between the 3 types?

Formula	Type	Ion pair	Name
$AlBr_3$	I	Al^{3+}/Br^-	aluminum bromide
$FeBr_3$	II	Fe^{3+}/Br^-	iron(III) bromide
BBr_3	III Molecular	no ions	boron tribromide

	type I	type II	type III
ionic or molecular	ionic	ionic	molecular
fixed / var charge	fixed	var charge metal	no ions
simplify ratio?	yes	yes	no NO_2 N_2O_4 different molecules
naming feature	metal cation + nonmetal -ide	roman num. = pos charge of metal cation	Greek prefixes = number of atoms

	Type	Ion pair	Name/Formula
Mn_3N_7	II	Mn^{7+}/N^{3-}	manganese(VII) nitride
platinum (IV) oxide	II	Pt^{4+}/O^{2-}	PtO_2
IF_6	III	no ions	iodine hexafluoride
AuS_2	II	Au^{4+}/S^{2-}	gold(IV) sulfide

$Au^{\square} \; S^{2-} \; S^{2-}$

$2(S^{2-}) = 4-$

$1(Au^{\square}) = 4+$

Polyatomic ions are multi-atom ions (charged molecules)

You must have these memorized for quiz 2 (after exam 1)
(Memorize their names, formulas, and charges!)

(NH_3 : ammonia) neutral molecule

ammonium (only positive)	NH_4^+
acetate	$C_2H_3O_2^-$
carbonate	CO_3^{2-}
hydrogen carbonate (or bicarbonate)	HCO_3^-
nitrite	NO_2^-
nitrate	NO_3^-
phosphate	PO_4^{3-} (P^{3-} phosphide)
hydrogen phosphate	HPO_4^{2-}
hypochlorite	ClO^- (chlorine and oxygen)
chlorite	ClO_2^-
chlorate	ClO_3^-
perchlorate	ClO_4^-
permanganate	MnO_4^-
sulfite	SO_3^{2-}
sulfate	SO_4^{2-}
hydrogen sulfate (or bisulfate)	HSO_4^-
hydrogen sulfite (or bisulfite)	HSO_3^-
chromate	CrO_4^{2-}
dichromate	$Cr_2O_7^{2-}$ *
cyanide	CN^-
hydroxide	OH^-
peroxide	O_2^{2-}

-ate : 1 more O than -ite

(Cl^- chloride) adding H decreases (-) charge by 1

(S^{2-} sulfide)

-ide monoatomic ions

Fixed-charge transition metals:

zinc	Zn^{2+}
silver	Ag^+