Monday, April 6th

Learning objective 3.12: *The student can make qualitative or quantitative predictions about galvanic or electrolytic reactions based on half-cell reactions and potentials and/or Faraday's laws.*

As you enter...(Write down the learning objective, the question and your answer.)

WELCOME BACK!

Review and correct your thermo quiz.

Homework: Chapter 18 Open Notes Quiz tomorrow

Big Idea 3: Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons.

1st period:
- Correct Thermo Quiz (20 min)
- Check Organic Chemistry HW from Break (25 min)

2nd period:
- Intro new unit: Electrochemistry (45 min)
- Experiment and Explain Activity

Tix out the door (Write your name on the paper.)

1. What predictions can you make about the function/process of electrochemical cells? (talk about electrons)

2. What evidence led you to make those predictions? (At least 2 examples)

① $\Delta G^\circ = -RT \ln K$ $\quad K=1 \rightarrow \Delta G=0$

② $\Delta G^\circ = \Delta H - T\Delta S$

$0 = \Delta H - T\Delta S$

$T\Delta S = \Delta H$

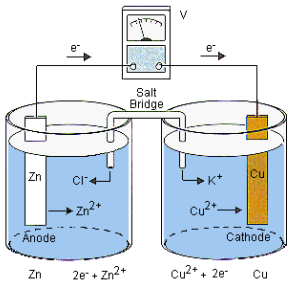
$T = \frac{\Delta H}{\Delta S}$

Tuesday, April 7th

Learning objective 3.12: *The student can make qualitative or quantitative predictions about galvanic or electrolytic reactions based on half-cell reactions and potentials and/or Faraday's laws.*

As you enter...(Write down the learning objective, the question and your answer.)

Describe the function/process of this electrochemical cell by describing at least 3 components of the system.



Homework: Finish classwork

****From now until the exam, I will hold review sessionson Wednesdays from 3-4 pm. I cannot make them mandatory but I strongly suggest you attend. I would like every one to at least come this week.**

Big Idea 3: Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons.

1st period:

- Ch. 18 Open Notes Quiz (20 min)
- Practice assigning oxidation states (20 min)
- Exit Tix (5 min)

Tix out the door (Write your name on the paper.)

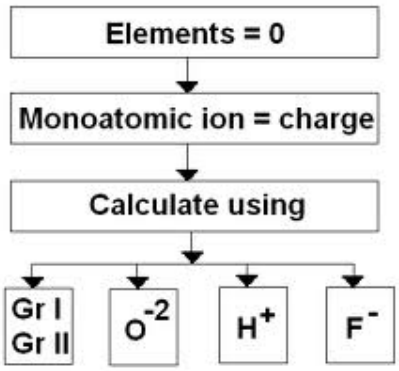
Assign the oxidation states for each element within the following reaction. (Write the oxidation numbers above their corresponding elements)

Electrochemical cells conduct a current through the transfer of electrons. We can use oxidation numbers to determine how many electrons are transferred in a given reaction.

Table 4.2 | Rules for Assigning Oxidation States

The Oxidation State of . . .	Summary	Examples
• An atom in an element is zero	Element: 0	$Na(s)$, $O_2(g)$, $O_3(g)$, $Hg(l)$
• A monatomic ion is the same as its charge	Monatomic ion: charge of ion	Na^+, Cl^-
• Fluorine is −1 in its compounds	Fluorine: −1	HF, PF_3
• Oxygen is usually −2 in its compounds Exception: peroxides (containing O_2^{2-}), in which oxygen is −1	Oxygen: −2	H_2O, CO_2
• Hydrogen is +1 in its covalent compounds	Hydrogen: +1	H_2O, HCl, NH_3

Summary



Assign oxidation states to all atoms in the following.

a. CO_2

b. SF_6

c. NO_3^-

Wednesday, April 8th

Learning objective 3.12: *The student can make qualitative or quantitative predictions about galvanic or electrolytic reactions based on half-cell reactions and potentials and/or Faraday's laws.*

As you enter...(Write down the learning objective, the question and your answer.)

Assign the oxidation states for each element within the following reaction. (Write the oxidation numbers above their corresponding elements)

$$3\ Zn + 2\ Fe(NO_3)_3 \rightarrow 3\ Zn(NO_3)_2 + 2\ Fe$$

0 3+ 5+2- 2+ 5+ -2 0

Homework: Finish classwork

****From now until the exam, I will hold review sessionson Wednesdays from 3-4 pm. I cannot make them mandatory but I strongly suggest you attend. I would like every one to at least come this week.**

Big Idea 3: Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons.

1st period:

- Review Quiz (10 min)
- Practice assigning oxidation states (30 min)
- BINGO
- MAHJONG

H_3O^+ +3 -2 = +1

CaC_2 +2 -2 C = -1

2nd period:

- Practice Writing Half-Reactions (45 min)
- Exit Tix (5 min)

Tix out the door (Write your name on the paper.)

Balance the following reaction using the half-reactions method. (Write the oxidation numbers and the half-reactions)

__ Na_3N --> ___ Na + ___ N_2

Thursday, April 9th

Learning objective 3.12: *The student can make qualitative or quantitative predictions about galvanic or electrolytic reactions based on half-cell reactions and potentials and/or Faraday's laws.*

As you enter...(Write down the learning objective, the question and your answer.)

Write the oxidation and reduction half-reactions for the following reaction.

$$4Fe + 3O_2 \rightarrow 2Fe_2O_3$$

$4Fe \rightarrow 2Fe_2O_3 + 12e^-$

$3O_2 + 12e^- \rightarrow 2Fe_2O_3$

Homework: Finish classwork

****Saturday Review Session... COMING SOON.**

Big Idea 3: Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons.

1st period:

- Practice Writing Half-Reactions (40 min)
- Exit Tix (5 min)

Tix out the door (Write your name on the paper.)

Balance the following reaction using the half-reactions method. (Label the oxidation and reduction half-reactions)

__ N_2 --> ___ H_2 + ___ NH_3

$Sn^{+2}Cl_2^{-1} + 2Fe^{+3}Cl_3^{-1} \rightarrow Sn^{+4}Cl_4^{-1} + 2Fe^{+2}Cl_2^{-1}$

ox $SnCl_2 \rightarrow SnCl_4 + 2e^-$

$Sn^{+2} \rightarrow Sn^{+4} + 2e^-$

RA

red $2Fe^{3+} + 2e^- \rightarrow 2Fe^{+2}$

OA

SI = Cl^-

$Cu^0 + 2Ag^+ \rightarrow Cu^{2+} + 2Ag^0$

ox/ $Cu \rightarrow Cu^{2+} + 2e^-$

red $2(Ag^+ + e^- \rightarrow Ag)$

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2. $2Fe + 3Pb^{+2} \rightarrow 2Fe^{3+} + 3Pb$

S $2Al^0 + 6H^+ \rightarrow 2Al^{+3} + 3H_2^0$

ox $2(Al \rightarrow Al^{+3} + 3e^-)$

red $3(2H^+ + 2e^- \rightarrow H_2)$ 6 e^- transferred

$2H^+ + Cr_2^{+6}O_7^{-2} + 6C_2H_5OH \rightarrow 2Cr^{+3} + 6C_2H_4O + 7H_2O$

ox $6(C_2H_5OH \rightarrow C_2H_4O + e^- + 2H^+)$

red $14H^+ + Cr_2O_7^{-2} + 6e^- \rightarrow 2Cr^{+3} + 7H_2O$

2

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c) $I_2^0 + H_2S^{-2} \rightarrow I^- + S_8^0$

ox $8H_2S \rightarrow S_8 + 16e^- + 16H^+$

red $I_2 + 2e^- \rightarrow 2I^-$

Friday, April 10th

Learning objective 3.12: *The student can make qualitative or quantitative predictions about galvanic or electrolytic reactions based on half-cell reactions and potentials and/or Faraday's laws.*

As you enter...(Write down the learning objective, the question and your answer.)

Balance the equation in terms of mass and charge using oxidation and reduction half-reactions.

$4OH^{-1} + 2Cl_2 \rightarrow 2Cl^{-1} + 2ClO^{-1} + 2H_2O$

$Cl_2 \rightarrow 2ClO^- + 2e^- + 2H_2O$

$Cl_2 + 2e \rightarrow 2Cl^-$

Homework: Topic A due Monday
****Saturday Review Session... SOTA Rm 173 from 9 am - 12 pm**
Bring your notebook, reference tables, and writing utensil.

Big Idea 3: Changes in matter involve the rearrangement and/or reorganization of atoms and/or the transfer of electrons.

1st period:
- Continued Practice Writing Half-Reactions (40 min)

2nd period:
- Electrochemical Cells and Potential (50 min)
- Exit Tix (5 min)

Tix out the door (Write your name on the paper.)

Balance the following reaction using the half-reactions method. (Label the oxidation and reduction half-reactions)

___ N_2 + ___ H_2 --> ___ NH_3

6. $Cr^{+3} + MnO_4^- \rightarrow Cr_2O_7^{-2} + Mn^{+2}$

$7H_2O + 2Cr^{+3} \rightarrow Cr_2O_7^{-2} + 6e^- + 14H^+$

$5e^- + 8H^+ + MnO_4^{2-} \rightarrow Mn^{+2} + 4H_2O$) 6

$11H_2O + 10Cr^{+3} + 6MnO_4^{2-} \rightarrow 5Cr_2O_7^{2-} + 22H^+ + 6Mn^{+2}$

7. $MnO_4^- + Mn^{+2} \rightarrow MnO_2$

$2H_2O + Mn^{+2} \rightarrow MnO_2 + 2e^- + 4H^+$) 3

$4H^+ + MnO_4^- + 3e^- \rightarrow MnO_2 + 2H_2O$) 2

$2H_2O + 3Mn^{+2} + 2MnO_4^- \rightarrow 5MnO_2 + 4H^+$

8. $MnO_4^- + IO_3^- \rightarrow Mn^{+2} + IO_4^-$

ox) $5(2OH^- + IO_3^- \rightarrow IO_4^- + 2e^- + H_2O$

red) $2(4H_2O + MnO_4^- + 5e^- \rightarrow Mn^{+2} + 8OH^-$

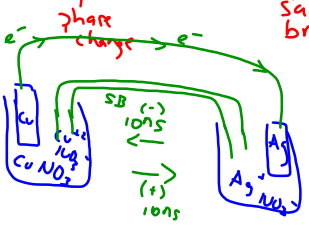
$5IO_3^- + 3H_2O + 2MnO_4^- \rightarrow 5IO_4^- + 2Mn^{+2} + 6O$

9. $12OH^- + 6Br_2 \rightarrow 2BrO_3^- + 10Br^- + 6H_2$

ex 2 "An Ox" anode oxidation — e⁻ → — "Red Cat" cathode reduction

a) $Cu(s) \mid Cu(NO_3)_2(aq) \parallel AgNO_3(aq) \mid Ag$

phase change — salt bridge



ex 3

ox: $Zn \rightarrow Zn(NO_3)_2 + 2e^-$ E =

red: $2e^- + Cu^{+2} \rightarrow Cu$ $E = 0.34\ V$

$E^\circ_{cell} = E_{red} - E_{ox}$

$1.10\ V = 0.34 - E_{ox}$

$E_{ox} = -0.76\ V$