## 04/11/2014 FSPX Electron Configuration

Aim: shell subshell orbital+Principles

* 10:10-10:15 Roll +Self Introduction
* 10:15-10:25 Match the name with the formula
* 10:25-10:30 Go through the answers
* 10:30-10:40 Revision (sub atomic particles, atomic number, mass number, isotopes)
* 10:40-11:05
* Sun-earth analogy (introducing the idea of shell) Example: H, He
* The shell represents the distance from the nucleus.
* Subshells Example: Na (spdf)+use the periodic table
* List a table including main shell, subshells, number of orbitals, maximum number of electrons per subshell, maximum number of electrons per shell.
* PPT presentation spdf and orbitals
* 11:05-11:15
* Energy level (shell subshell orbital)
* 11:15-11:40
* The Pauli Exclusion Principle
* The Hund’s rule
* The energy sequence of orbitals
* The Aufbau Principle
* 11:40-12:00
* example + exception Copper and Chromium

## 05/11/2014 FSP2 Redox week 13 Wednesday

1. Roll
2. What does redox mean. Give examples of apples and cars. Give the reaction of Mg and O2 as an example.
3. The first definition of oxidation: Oxidation is a gain of oxygen.
4. Mg is oxidised by O2, so O2 is the oxidising agent/oxidant/oxidiser.
5. Examples: O2, MnO4-, Cr2O72-, H2O2, Cl2, Br2, I2,
6. Mg is oxidised by oxygen, what about Oxygen? Reduction and oxidation happen at the same time. Oxygen is reduced by magnesium. Magnesium is the reducing agent/reducer/reductant. Reactive metals, I-, Br-  are examples of a reducing agent.
7. The first definition of reduction, reduction is a loss of oxygen.

Fe2O3 +CO= Fe + CO2  high temperature. (Does not have oxygen involved in the redox)

1. Second example: methane reacting with oxygen.
2. Second definition of redox. Oxidation is a loss of hydrogen and reduction is a gain of hydrogen.
3. The first two definitions are not the general definitions of the redox.

Important points: Oxidation and reduction happen at the same time.

 One chemical species is oxidised while the other one is reduced.

 The reaction involving oxygen is a redox whereas a redox reaction does not necessarily have oxygen in the system.

1. The general definition of redox involves electron transfer.

Use Mg + O2, Fe2O3 +CO and CH4 +O2 as the examples to show electron transfer. ( may use the idea of a half equation)

1. The two general definitions: oxidiation is a loss of electrons while reduction is a gain of electrons. Use lending and borrowing coins as an example. Oxidation is the chemical process where a chemical species increases in its oxidation state whereas reduction is the chemical process where a chemical decreases its oxidation state.
2. The change in oxidation number is a quick way of determining
3. If a reaction is a redox (if the oxidation number changes, then it is.)
4. the substance oxidised (gain in oxidation number) and the substance reduced (loss in oxidation number)

Mg in HCl

I will use this as an example.

Step 1: Write a balanced equation.

Step 2: Figure any possible os change. If there is no os change, we do not have a redox reaction.

Step 3:If there is a change is os, we need to identify the oxising agent and reducing agent.

Definitions: A reducer is the substance that has an increase in its os in a redox reaxtion. A oxidiser is the substance that has a decrease in its os in a redox.

You can use the reaction between oxygen and magnesium as an example to remember this.

From the perspective of electron transfer, Mg loses two electrons..

Remind them of the limitation of the theory of electron transfer.

One example is the reaction between hydrogen and oxygen to form water…

Using os change is an easier way to determine redox.

1. **Summary**

In a redox reaction, an oxidiser is a substance that

* has a decrease in os.
* accepts electrons (or has more control of electrons)
* is reduced by the reducing agents.
* Oxidises another substance which is reducing agent.

In a redox, a reducer is a substance that

* has an increase in its os.
* Loses electrons (or in a covalent compound, has less control of electrons)
* Is oxidised by the oxidiser
* Reduces another substance (oxidiser)

## 11/11/2014 FSPX Morning

* Roll +key dates (Assignment due Thursday and Test next Monday)
* Revision: How to figure out the EC for elements and ions using the three rules + exception (Copper and chromium)
* Introduction of the table (elements)
* The song of the periodic table.
* Periodic law, groups and periods and how they are related to the ec
* Blocks
* Write down the electronic configuration of a neutral element according to the periodic table of elements. (including examples of ions)
* How to use electronic configuration to find where the element is in the table

Example:(workbook page 19). We should be able to write down ec according to the table and also we should locate the element in the table according to the ec. We need to think both ways.

* Atomic radii of neutral elements across the table, down the table (two factors, one factor outweighs the other for the element down the table in the same group)
* Atomic radii of ions( cations and anions)
* Workbook page 20 q6 page 22 q1 page 23 q5 page 24 q6 page 25 q8 q9 page 26 q10

## 11/11/2014 FSPX Afternoon

* Roll +key dates (Assignment due Thursday and Test next Monday)
* Revision: periodic law, groups , periods and blocks and
* Write down the electronic configuration of a neutral element according to the periodic table of elements. (including examples of ions)
* How to use electronic configuration to find where the element is in the table

Example:(workbook page 19). We should be able to write down ec according to the table and also we should locate the element in the table according to the ec. We need to think both ways.

* Atomic radii of neutral elements across the table, down the table (two factors, one factor outweighs the other for the element down the table in the same group)
* Atomic radii of ions( cations and anions)
* Workbook page 20 q6 page 22 q1 page 23 q5 page 24 q6 page 25 q8 q9 page 26 q10
* Electronegativity (two words in one)

Definition, across the period, down the group (two factors where on outweighs the other)

Electronegativity values

* Workbook pg18: Q3 Q4 pg20: q7, pg21 q8 q9, pg24 q7
* Introduction of Metals, Non-Metals and metalloids

Group 1 and group 2 (mainly atoms except H or He)

Metals form cations

Group 15, 16 and 17 non metals.

Non-metals form anions.

D block= transition metals. They can form various charged ions.

* Use the periodic table to show where metals, non-metals and metalloids are.
* Electro negativity values for metals and non-metals.

## 13/11/2014 FSX morning

* Roll +key dates
* Revision: Atomic radii and electronegativity (two factors, core charge and the number of shells---shielding effect; two dimensions: groups and periods)
* Metals, Non-Metals and metalloids
* Definition: valence electrons

Group 1 and group 2 (mainly atoms except H or He)

Metals form cations

Group 15, 16 and 17 non metals.

Group 18: Noble gases

Non-metals form anions.

D block= transition metals. They can form various charged ions.

* Use the periodic table to show where metals, non-metals and metalloids are.
* Electro negativity values for metals and non-metals.
* Properties of metals and non-metals (state, density, luster, malleability, ductility, electrical and thermal conductivity, mp and bp, sound)

Group Activity Workbook page 76-77 (done in pairs)

Workbook Question pg 17 Q1, Q2; pg 19 Q5; pg 22 Q3 pg 23 Q4;

If students have finished, they can either do assignment 2 or review atomic structure.

## 11/13/2014 FSPX Afternoon

* Roll +key dates
* Remind them of the classroom on Friday.
* Revision (periodic law, groups and periods) 5 min
* Atomic radii of neutral elements across the table, down the table (two factors, one factor outweighs the other for the element down the table in the same group)
* Atomic radii of ions( cations and anions)
* Electronegativity (two words in one)

Definition, across the period, down the group (two factors where on outweighs the other)

Electronegativity values

* Workbook page 20 q6 page 22 q1 page 23 q5 page 24 q6 page 25 q8 q9 page 26 q10
* Workbook pg18: Q3 Q4 pg20: q7, pg21 q8 q9, pg24 q7

## 18/11/2014

FSPX morning

1. Electronegativity difference between metals and non-metals. Example: NaCl
2. Metals lose electrons completely, non metals gain electrons.
3. Ions: the size of the charge is determined by the number of electrons gained or lost.
4. Stable state: 8 valence electrons similar to the noble gases.
5. Examples: Na, Cl, Mg form ions (How we can use the group to identify the number of electron transferred)
6. Ionic bonding definition (bonding contains ions ---electrostatic attraction)
7. Ionic bonding formation loses electron--very stable (draw a diagram on the board)
8. Lattice NaCl
9. Ionic strength
10. High melting point and conductivity
11. Positive ions are given the same nae as the original metal, but non-metal ions are given an ide ending. Example: chloride, sulphide,
12. Workbook pg 30 q1 pg28 q4; pg29 q5 q6;
13. Revision sheet

## 18/11 FSPX Afternoon.

* Points 1-12 (see morning lesson plan)
* Formulae of ionic compounds
* Workbook pg30 q2 pg 31 q3 q4 q5
* Revision sheet

## 20/11 FSPX Morning

* Revision: electronegativity and ionic bonding, how to write down the formulae for ionic compounds (main groups), transition metal difficult to predict the charges, conductivity (Ionic solutions are called electrolytes) and high melting point of ionic compounds (10 min)
* Metallic lattices--electrostatic forces between metal ions and delocalised electrons. (similarity and difference compared to ionic bonding)
* Conductivity of metals and malleability of metals
* Workbook pg27 q1, q2, pg28, q3, pg32 q6 pg32 q7
* test

## 25/11/2014 FSPX Morning

* Revision: make a table comparing metals and ionic compounds (attraction, melting point, malleability, electric conductivity)
* Ionic compounds ---- great difference in electronegativity between metals and ion-metals. Covalent compounds----electronegativity difference not great enough. (Electrons are shared not transferred)
* In ionic compounds, 8 (or 2) valence electrons means stability. This is also applicable in covalent compounds. (similarity and difference)
* Covalent bonds ---the overlap of orbitals
* Covalent bonding---coulombic forces sigma bonding (head on overlaping)& pi bonding
* Covalent molecules ---represents the actual number of each type of atom in the molecule--- molecular formula
* Workbook pg 33 Q1-Q6 pg 34 q7 pg36 q10 pg37 q12
* Primary bonding and secondary interactions
* Properties of covalent compounds
* Workbook pg 37 q11
* Test feedback

## 25/11/2014 FSPX Afternoon

* See lesson plan above
* Continuous covalent lattices
* Lewis Diagrams (introduction, basic, no expanding the octet)
* Workbook pg34 q8
* Test feedback

## 27/11/2014 FSPX Morning

* Revision:covalent bond, covalent molecules and covalent compounds and properties
* Lewis Diagrams rules, two exampels, CH4 NH3
* Expanding the octet, SO2, SO3
* Structural formulae
* Workbook pg35 q9 pg7 q12 pg40 q1
* VSEPR to predict molecular shapes
* Molecular shapes (linear bent, trigonal planar, trigonal pyramid,)
* Workbook pg38-pg39 (ignore the last column)
* Test revision summary

## 27/11/2014 FSPX Afternoon

* Continuous covalent lattices
* Lewis Diagrams (introduction, basic, no expanding the octet)
* Workbook pg34 q8
* Expanding the octet, SO2, SO3
* Structural formulae
* Workbook pg35 q9 pg7 q12 pg40 q1

Continuo