Tuesday, May 21/13
Science 122

Announcements

** Need an activity re a course topic before the end of May.

1. Worksheet - Energy of Photons, Work Function, Etc.
   Worksheet - Energy Levels
2. Test - Nuclear and Quantum Physics -> Thursday
3. Electrochemistry

Format

Part I - Short Answer

→ terms
  ie/ nucleon, nuclide

→ notation etc
  ie/ isotope
  ie/ decay particles.
    α or ^4_2He
    β^- or $^0_{-1}e$ or ^-_1e

→ formation of $\bar{e}$ and etc

→ write decay reactions
  ie/ parent nucleus → daughter nucleus + ☐

→ Planck, Einstein

→ photo electric effect.
  + terminology
  + graph

→ energy level diagrams

Part II - Problems.

Formulas:

Nuclear Physics ⇒ A, λ, N, N_o, m, $T_{1/2}$, etc.
(2 worksheets)

Quantum Physics ⇒ E, ϕ, f_c, E_n, etc
(2 worksheets)

Science 122

Electrochemistry

~~Electrochemistry~~ – electron transfer in rxns)
chemical rxns.
– photosynthesis, respiration, combustion, metallurgy, etc

From metallurgy, the term reduction came to be associated with producing metals from their cpds. (compounds)

$$Fe_2O_3(s) + 3CO(g) \rightarrow 2Fe(s) + 3CO_2(g)$$

$$SnO_2(s) + C(s) \rightarrow Sn(s) + CO_2(g)$$

→ reducing agents → cause or promote the reduction of a metal cpd to an elemental metal. RA

Reactions of substances with oxygen were called oxidation rxns. The term oxidation has been extended to include a wide range of combustion and corrosion reactions.

$$2Mg(s) + O_2(g) \rightarrow 2MgO(s)$$

$$2Al(s) + 3Cl_2(g) \rightarrow 2AlCl_3(s)$$

oxidizing agents → cause or promote the oxidation of a metal to produce a metal cpd. OA

Single Replacement Reaction in Solution.

ie/ reduction of aqueous silver nitrate to silver metal in the presence of solid copper

$$2AgNO_{3(aq)} + Cu_{(s)} \rightarrow Cu(NO_3)_{2(aq)} + 2Ag_{(s)}$$

Look at electron transfer:

⇒ **Half-Reaction:**

$$Ag^{+}_{(aq)} + 1e^{-} \rightarrow Ag_{(s)}$$

Gain of electrons is reduction.

Half-Reaction:

$$Cu_{(s)} \rightarrow Cu^{+2}_{(aq)} + 2e^{-}$$

Loss of electrons is oxidation.

LEO the lion says GER! ⇐

Redox Reactions

reduction → oxidation } simultaneous processes

Half-reactions can be used to determined a balanced net ionic equation.

$$2\left[Ag^{+}_{(aq)} + 1e^{-} \rightarrow Ag_{(s)}\right]$$

$$Cu_{(s)} \rightarrow Cu^{+2}_{(aq)} + 2e^{-}$$

$$2Ag^{+} + 2e^{-} + Cu \rightarrow 2Ag + Cu^{+2} + 2e^{-}$$

net equation : $2Ag^{+}_{(aq)} + Cu_{(s)} \rightarrow 2Ag_{(s)} + Cu^{+2}_{(aq)}$

reduced

oxidized.

Try: ① Write the balanced half-reactions
② Write the balanced net reaction

a) $Br_{2(\ell)} + KI_{(aq)} \rightarrow I_{2(s)} + KBr_{(aq)}$

b) $Al_{(s)} + Fe_2O_{3(s)} \rightarrow Fe_{(s)} + Al_2O_{3(s)}$

Not Balanced.