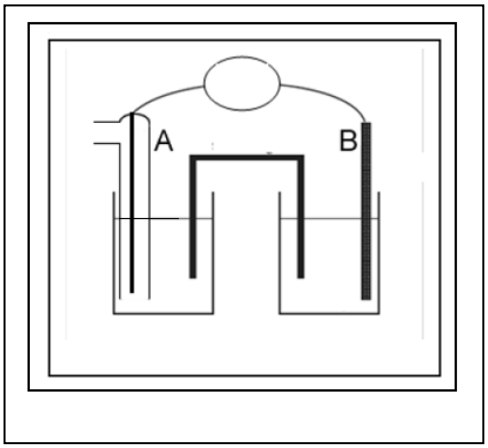
Redox reactions - revision Lesson 7a

1) A galvanic cell is formed using the following two half reactions at standard conditions.

$Sn^{4+}(aq) + 2e^- \rightleftharpoons Sn^{2+}(aq)$ $E^o = +0.15$

$Cl_2(g) + 2e^- \rightleftharpoons 2Cl^-(aq)$ $E^o = +1.36$



a) Using the template shown on the right label the:
i) contents of the half cell with electrode A
ii) contents of the half cell with electrode B
iii) the EMF of the cell
iv) the anode
v) the cathode
vi) the polarity of each electrode
vii) the direction of cation flow
viii) the direction of anion flow
ix) the direction of electron flow.

b) What are electrodes A and B made from?

What properties should these material have in order to be used as electrodes in this galvanic cell?

c) Identify the chemical species that acts as the:

i) reductant -

ii) oxidant

d) Identify the redox conjugate pairs in each half cell.

i)

ii)

d) Complete the sentences. A strong oxidant forms a _____ conjugate reductant. A reductant will _____electrons to form its _____ oxidant An oxidant will _____ electrons to form its conjugate _____. In a half cell, the species donating electrons is the _____ which forms its _____ _____ . for example, Cu (donor) and Cu^{2+} (acceptor); Cu/Cu^{2+}.

e) The half cell on the right of the galvanic cell shown above is replaced with the hydrogen peroxide half cell shown below

$H_2O_2(aq) / H_2O(l)$ $E^o = +1.77$

i. Write a balanced half equation for the reaction occurring in the half cell on the right, occurring in an :

a) acidic solution _____

b) alkaline solution _____

iii. Explain how the pH of the solution in half cells A and B will change as the cell discharges if an

- acidified solution is used.

- alkaline solution is used.

iv. Using the diagram on the right, label the following:

i) the reductant

ii) the oxidant

iii) the EMF of the cell

iv) the anode

v) the cathode

vi) the polarity of each electrode

vii) the direction of cation flow

viii) the direction of anion flow

ix) the direction of electron flow.