

Seb Academy

Topic: Redox Homework 2

Time: 45 min

Date: _____

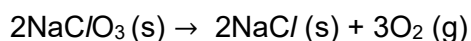
Name: _____

MCQ :

(2014/CHIJS/S4/FE/2) Skill 3 Identify Redox Reactions Sodium chlorate(V),
NaClO₃

- Sodium chlorate(V), NaClO₃, is used in some aircrafts as a source of emergency oxygen when there is a drop in cabin pressure. The catalyst, iron powder, is mixed with sodium chlorate(V) and can be ignited by a charge, which is activated by pulling on the emergency mask.

Sodium chlorate(V) decomposes as shown:



- (a) With reference to the oxidation states, explain if the above reaction is a redox reaction.

[2]

- (b) Assuming all the sodium chlorate(V) has fully decomposed, briefly describe how you can obtain a pure, dry sample of sodium chloride salt from the remaining mixture with iron powder.

[2]

- (c) Calculate the mass of sodium chlorate(V) required to produce 2 dm³ of oxygen gas.

[2]

[Total: 6]

(2015/S4NYGH/IPFE/3) Redox with QA

- (2015/S4NYGH/IPFE/3) Hydrogen peroxide can act as both an oxidising and reducing agent. State the observations in each of the tests as described below.

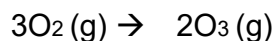
Test	Observation	Nature of hydrogen peroxide
hydrogen peroxide is added to iron(II) sulfate		Oxidising agent
hydrogen peroxide is added to acidified potassium manganate (VII)		Reducing agent
hydrogen peroxide is added to potassium iodide		Oxidising agent

[3]

[Total 3 marks]

(2020/TKGSS/S4/FE/7) moles and redox

- Ozone is usually made by passing oxygen gas through a tube between two highly charged electrical plates.



The reaction is stopped before it can go to completion, so a mixture of the two gases results. The concentration of O_3 in the mixture can be determined by its reaction with aqueous KI.



The iodine formed can be estimated by its reaction with sodium thiosulfate.



When 192 cm^3 of a mixture of oxygen and ozone gas at r.t.p was passed into an excess of aqueous KI, iodine was formed. The iodine formed was titrated with 80 cm^3 of $0.1 \text{ mol/dm}^3 \text{ Na}_2\text{S}_2\text{O}_3$.

- • Calculate the number of moles of iodine produced from the reaction with aqueous potassium iodide.

[2]

- Calculate the volume of ozone present in the 192 cm^3 mixture.

[1]

- Hence, calculate the volume of unreacted oxygen.

[1]

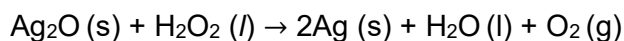
- Using the oxidation state of sulfur, explain whether sodium thiosulfate is an oxidising or a reducing agent.

[2]

[Total:6 marks]

(2014/NYGH/S3/IP/FE/P2/7) mod Ag₂O and identifying redox

- (2014/NYGH/S3/IP/FE/P2/7) mod Hydrogen peroxide, H₂O₂ reacts with silver oxide according to the following equation.



- (a) Identify the oxidising agent and the reducing agent from the reaction above.

[1]

- (b) Suggest a chemical reagent to add to Ag₂O to prove that is the redox agent as described in (a). Describe the positive test result you are expected to observe.

[2]

[total: 3 marks]

Redox agents

(d) describe the use of aqueous potassium iodide and acidified potassium manganate(VII) in testing for oxidising and reducing agents from the resulting colour changes.

- (2009/O/GCSE/19) Which are the colour changes observed?

When potassium iodide is oxidised

When acidified potassium dichromate(VI) is reduced

A Brown to colourless

Green to orange

B Brown to colourless

Orange to green

C Colourless to brown

Green to orange

D Colourless to brown

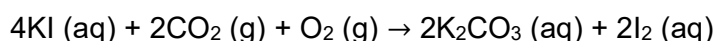
Orange to green

- (2017/Bendemeer/P1/34) A reducing agent is added separately to four different reagents and the colour changes are recorded.

What is the correct description of the colour change?

	Chemical added	Colour change
A	aqueous bromine	colourless to brown
B	acidified potassium dichromate(VI)	green to orange
C	aqueous potassium iodide	colourless to brown
D	acidified potassium manganate(VII)	purple to colourless

- (2018/TKGSS/FE/1) An aqueous solution of potassium iodide turns brown due to the reaction below.



Which statements are correct?

- KI (aq) is oxidised by O₂ (g).
- KI (aq) is oxidised by CO₂ (g).
- Brown colour is due to K₂CO₃ (aq) formed.

- A** 1 only
B 2 only
C 1 and 3 only
D 1, 2 and 3

- (2017/GMS(S)/P1/Prelim/18) Small portions of aqueous potassium iodide (KI) and acidified potassium manganate (VII) (KMnO₄) were separately added to four solutions.

The colour changes are shown in the table below:

Solution number	Potassium iodide	Potassium manganate
1	colourless to brown	purple to colourless
2	colourless to brown	no change
3	no change	purple to colourless
4	no change	no change

Which solution(s) contained an oxidising agent?

- A** 1 only
B 1 and 2
C 1 and 3
D 2 and 4

- In which equation(s) is nitrogen being reduced?

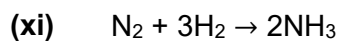
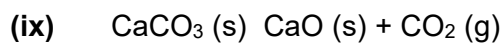
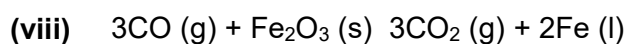
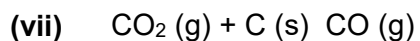
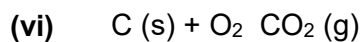
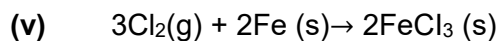
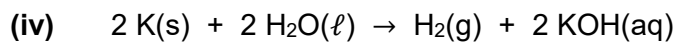
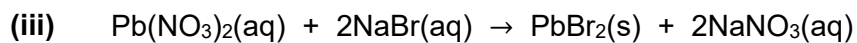
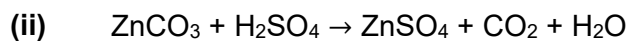
- HNO₃ (aq) + NH₄OH (aq) → NH₄NO₃ (aq) + H₂O (l)
- 4NO₃⁻ (aq) + 5CH₂O (l) + 4H⁺ (aq) → 2N₂ (g) + 5CO₂ (g) + 7H₂O (l)
- 2NO₃⁻ (aq) + 4H⁺ (aq) + Cu (s) → Cu²⁺ (aq) + 2NO (g) + 2H₂O (l)

- A** 3 only

- B** 1 and 2 only
- C** 2 and 3 only
- D** 1, 2 and 3

- Identify whether a redox reaction has taken place: (Write Y/N)

(a)



[Total: 7 marks]