

## LAB 5.7 - ELECTROLYSIS

### ELECTROLYSIS

#### Introduction

Molten ionic compounds conduct electricity and can therefore be electrolysed.

Aqueous solutions of ionic compounds conduct electricity and can also be electrolysed.

All aqueous solutions contain  $\text{H}^+$  and  $\text{OH}^-$  ions in addition to the ions from the ionic compound.

It is possible to predict the products of the electrolysis of a molten or aqueous electrolyte.

#### Procedure

Watch the videos and answer the questions

You do not need to watch the entire length of the video; just enough to answer the questions.

- 1) the electrolysis of molten  $\text{PbBr}_2$  <https://www.youtube.com/watch?v=cpf9oNRZy-w>

(a)	Why does no current flow when the $\text{PbBr}_2$ is solid?	Ions cannot move So doesn't conduct electricity
(b)	Which element is produced at the cathode? What does it look like?	Lead, molten silvery/grey metal
(c)	Which element is produced at the anode? What does it look like?	Bromine – red/brown liquid/vapour

- 2) the electrolysis of  $\text{NaOH}(\text{aq})$  [www.youtube.com/watch?v=vFR9zUGt2C4](http://www.youtube.com/watch?v=vFR9zUGt2C4)

(a)	Which element is produced at the cathode?	Hydrogen
(b)	Which element is produced at the anode?	Oxygen
(c)	Why is sodium not produced in this reaction?	Sodium is more reactive than hydrogen
(d)	Explain why different volumes of gas were produced at the two electrodes	Water contains $\text{H}_2\text{O}$ so $\text{H}_2$ and $\text{O}_2$ are produced in the ratio 2:1

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3) The electrolysis of  $\text{CuCl}_2(\text{aq})$

[www.youtube.com/watch?v=mIT-nghOB4](http://www.youtube.com/watch?v=mIT-nghOB4)

(a)	Which element is produced at the cathode?	copper
(b)	Which element is produced at the anode?	chlorine
(c)	How did the demonstrator identify the product at the cathode?	he scraped an orange metal off the cathode
(d)	How did the demonstrator identify the product at the anode?	the gas turned blue litmus paper red then white
(e)	If you carried out this experiment with a much more dilute solution of copper chloride, which gas would have been produced at the anode instead?	oxygen

4) Electroplating a metal with copper

<https://www.youtube.com/watch?v=gTjWkeSpRqk>

(a)	What substance was dissolved in water to make the electrolyte?	copper sulfate
(b)	How would you change this apparatus to coat an iron nail with a layer of silver?	put an iron nail at the cathode and make sure the electrolyte contains silver ions