

Subject: Chemistry

Topic: Electrolysis

Sub-topic: Electroplating

Level: S.4

Learning objective:

1. Content

Students should be able to design an experiment to electroplate a coin with nickel.

2. Language:

Students should be able to write an experimental report on the electroplating of a coin with nickel.

The report should include the following sections:

1. Title of the experiment
2. Objective
3. Procedure
4. Observation / Results
5. Interpretation / Discussion
6. Conclusion

S.4 Chemistry
Electrolysis
Electroplating
Role-play (As A Chemical Engineer)

Name: _____ No.: _____ Class: _____ Date: _____



Speaking and Writing

Instructions:

Imagine you were a chemical engineer. Now, you are requested to design an experimental setup for electroplating a coin with nickel. The materials available are listed as follows:

<i>Apparatus:</i>	<i>Chemicals:</i>
d.c. supply	detergent solution
connecting wires with crocodile clips at both ends	distilled water
sandpaper	2M hydrochloric acid
ammeter	copper(II) sulphate solution
2 x 100 ml beaker	nickel(II) sulphate solution
tongs	copper foil
electrode foil holder	nickel foil
	a 10-cents coin
	paper towels

1. In the space provided below, write down [fix the numbering:
 - i) the step-by-step procedure (using imperatives) for the experiment, e.g.
 1. Add 50 ml water into the test tube.
 2. Heat it in a water bath
 3. ...;
 - ii) any additional safety precautions; and
 - iii) draw the experimental setup.

1. Now, discuss your plan with 3 other 'chemical engineers' (i.e. your classmates) and find out the best way to carry out the experiment. Revise what you have written in 1 above. Then carry out the experiment in your group following the procedure you have agreed.
2. Record the appearance of your plated coin below.
3. Write a laboratory report with the following headings:
 1. Title of the experiment
 2. Objective
 3. Procedure (*Past tense with passive voice*)
 4. Observation / Results
 5. Interpretation / Discussion
 6. Conclusion
4. Questions for further thoughts
 - (1) Write half equations to show what has happened at the cathode and anode.
 - (2) Usually the results of electroplating carried out in the school laboratory are not satisfactory. Suggest what can be done to get a brighter and smoother coating.
 - (3) It is interesting to note that objects (e.g. jewellery), which are not metals, can be electroplated. Find out what preparation work has to be done on such objects before electroplating.
 - (4) The waste solutions from electroplating factories can cause pollution and are harmful to plants and animals if they are allowed to flow into streams or the sea before being treated. Suggest some possible methods to solve these problems.
 - (5) Suppose you need to electroplate silver onto an object. Suggest the electroplating solution and anode you would use.