Electrolysis: mobile charge carriers

Student activity • observation and reasoning

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The question

Which particles can carry charge through this material?

Compare ionic solids, melts, solutions and molecular compounds using particle diagrams. Distinguish electrons in wires from ions in an electrolyte.

Equipment

• Booklet, pencil, periodic table and optional molecular model kit

Desk activity only; keep small model pieces away from mouths.

Course coverage: Chemistry only: 1.55C–1.57C. Particle modelling; no molten material or live circuit.

Plan, model or apparatus sketch

Draw a labelled structure or model to explain your reasoning for this lesson.

Method and reasoning

Read the whole sequence before starting

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1. Draw an ionic lattice with positive and negative ions in fixed positions.

2. Draw the same compound molten with mobile ions; explain conductivity without saying ions are created by melting.

3. Draw an aqueous ionic solution and label both ion types moving through water.

4. Compare a molecular sugar solution with an acid solution that forms ions in water.

5. Label cation as positive and anion as negative. Show their motion towards opposite-charge electrodes in electrolysis.

6. Trace charge transport through metal leads and electrolyte, distinguishing electrons from ions.

Cleanup

- Return shared equipment and retain corrected reasoning.

Record your evidence

Blank spaces are for your own work

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Reference and task data

Simple molecular substances generally lack mobile charged particles. Some covalent compounds form ions when dissolved, so their aqueous solutions can conduct. Graphite is a conducting covalent network and is not a molecular-compound example. Melting an ionic lattice frees existing ions to move.

Task	My structure / working	Reason / correction
Solid / molten ionic		
Aqueous / molecular		
Circuit charge carriers		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

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1. Why does solid sodium chloride not conduct?

2. Why can molten sodium chloride conduct?

3. Define cation and anion.

4. Which particles carry charge through metal wires?

5. Why can hydrochloric acid solution conduct?

6. Why is sugar solution a useful contrast?