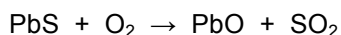




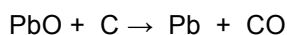
METAL EXTRACTION 2

1 Lead is extracted from the ore galena that contains lead(II) sulphide, PbS.

Step 1 roasting lead(II) sulfide in air to form lead(II) oxide



Step 2 using carbon to displace lead from lead(II) sulfide



a) Galena is an ore of lead. What is an ore?

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b) Why does carbon displace lead in step 2?

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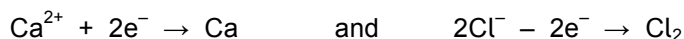
c) Explain why the lead(II) oxide is reduced in step 2.

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d) Explain clearly why step 2 is a redox reaction.

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2 Calcium is often extracted by electrolysis of molten calcium chloride, CaCl₂. The half equations for the reactions at the electrodes are:



a) Why can calcium not be extracted by heating calcium chloride with carbon?

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b) Write the half equation that shows a reduction process. Explain your answer.

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c) Explain clearly why the electrolysis is a redox process.

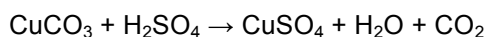
d) Calcium chloride must be molten to conduct electricity. It melts at 772°C.

i) Explain why the calcium chloride must be molten to conduct.

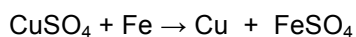
ii) Explain why calcium chloride has a high melting point.

3 Copper can be extracted from copper(II) carbonate in the ore malachite by

Step 1 reacting copper(II) carbonate with sulfuric acid to form copper(II) sulfate



Step 2 using iron to displace copper from copper(II) sulfate solution



a) Why does iron displace copper in step 2?

b) Write two half equations to show what happens in step 2.

half equation 1

half equation 2

c) Explain clearly why step 2 is a redox reaction.

d) Write an ionic equation for step 2.

Area	Strength	To develop	Area	Strength	To develop	Area	Strength	To develop
Done with care and thoroughness			Understand redox in terms of oxygen			Explain conductivity of ionic cpds		
Good SPG			Understand redox in terms of electrons			Write half equations for displacement		
Knows what an ore is			Explain displacement in terms of redox			Write ionic equations for displacement		
Understand why displacement occurs			Explain why ionic cpds have high mpt					