Worksheet 8.5

Metals from their ores

Copper and zinc both occur in the Earth's crust as their metal sulfides: CuS (pyrite) and ZnS (zinc blende).

The first step in extraction of the metal is roasting the ore in air:

$2ZnS + 3O_2 \rightarrow 2ZnO + 2SO_2$

The sulfur dioxide is used in the manufacture of sulfuric acid and the oxide is reduced by carbon in a blast furnace:

$ZnO + C \rightarrow Zn + CO$

1 What mass of zinc can be obtained from 194 tonnes of zinc blende?

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2 How is the zinc separated from the mixture in the blast furnace?

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3 Write equations to show how sulfur dioxide is used to make sulfuric acid in the Contact process.

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4 Copper is extracted in a very similar way. Write an equation to show the roasting of pyrite.

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5 The blast furnace reaction is also similar but carbon dioxide is produced instead of carbon monoxide. Write an equation for this reaction.

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6 The copper from this furnace is impure and still contains some copper oxide. This is often removed by blowing methane through the mixture to remove the oxygen from the oxide.

What are the products formed when the methane reacts with oxygen?

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7 Methane is passed through the mixture until the flame produced turns green. What substance causes the flame to turn green?

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8 The copper is further purified by electrolysis. What substances are used for the electrodes in this process?

Anode: .....

Cathode: .....