

C1 - Metals Quiz

What is an ore?

Rocks that contain enough metal compounds that make it economically viable to extract the metal compound.

What is a native metal?

A metal that can be found uncombined in the Earth's crust.

What is smelting?

Heating a metal ore to extract the metal.

Why is copper extracted from low-grade ores?

Copper ores are running out and there are no high-grade ores left.

Describe bioleaching.

Bacteria feed on low grade ores. A leachate is produced (this is a solution of copper ions). The leachate is either electrolysed or scrap iron is added to it.

Why is scrap iron used to extract copper from leachate?

Scrap iron is cheap. Iron is more reactive than copper and will displace the copper ions from the leachate.

Why is oxygen used to produce low-carbon steels?

Oxygen reacts with the carbon in pig iron to make carbon dioxide. This removes the carbon from the steel.

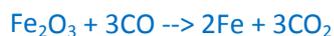
Why is it more expensive to extract titanium than iron?

Extracting titanium involves more steps than extracting iron. Larger amounts of energy are also needed. Argon is used in the process which is expensive.

Iron oxide is heated with carbon inside the blast furnace. What type of reaction takes place?

Reduction. Carbon removes the oxygen from iron oxide.

What is the equation for iron oxide reacting with carbon monoxide to make iron and carbon dioxide?



Describe how aluminium is extracted from bauxite.

Bauxite is mixed with cryolite to lower the melting point. The mixture is heated and electrolysed. Aluminium is produced as well as carbon dioxide.

Why is it important to recycle aluminium cans?

To preserve aluminium ores, save 95% of energy compared to extracting it from bauxite. Reduce CO₂ emissions.

What is phytomining?

Plants absorb copper ions from low-grade copper ores. The plants are harvested and burnt. The ash left behind is dissolved in sulphuric acid to produce copper sulphate solution. The copper sulphate solution is either electrolysed or scrap iron is added to displace the copper ions

What are the pros and cons of phytomining?

Pro: heat released during burning of plants can be used to heat houses or produce electricity. Plants absorb CO₂ during photosynthesis. Cons: not continuous/Batch process so it takes a long time.

Describe the electrolysis of copper sulphate.

Copper sulphate is used as the electrolyte. Positive copper ions in the copper sulphate solution are attracted to the negative electrode where they take on 2 electrons and form copper atoms.

Why is it expensive to extract metals from metal ores?

Large amounts of energy are needed, large amounts of rocks/ores have to be mined, many steps are needed to process the ores.

Where in the periodic table are the transition metals?

In the middle of the periodic table.

Why are alloys used instead of pure metals?

Alloys are stronger and have different properties.

Give two examples of copper alloys.

Brass (copper and zinc) used to make musical instruments; Bronze (copper and tin) used to make statues.

Give a use for titanium alloys.

Hip replacements. Titanium alloys are light weight and corrosion resistant.

Explain why titanium alloys are used to build fighter jets.

Low density, high melting point which means during supersonic flight the alloy does not melt.

What are the physical properties of metals?

Good conductors of heat and electricity, malleable, ductile.

Why is pig iron too brittle?

It contains too much carbon from the reduction process inside the blast furnace.

Describe the blast furnace process.

Limestone, coke and iron ore are added at the top. Hot air is blasted in from the bottom. The hot air burns the coke and makes carbon dioxide. Carbon dioxide reacts with more coke to form carbon monoxide. Carbon monoxide reacts with iron oxide and forms molten iron and carbon dioxide. The molten iron sinks to the bottom. Limestone reacts with impurities and forms slag which floats on top of the molten iron.