METAL EXTRACTION 1

WHERE DO METALS COME FROM?

Only a few metals are found as elements on Earth – these are the least reactive metals (e.g. gold, platinum)

Most metals are produced by chemical reactions ("extracted") from compounds found in rocks (e.g. aluminium is produced from aluminium oxide found in bauxite).

METAL ORES

if a metal can be extracted for profit from the compounds in a rock, then the rock is called on **ore**.

REDUCTION

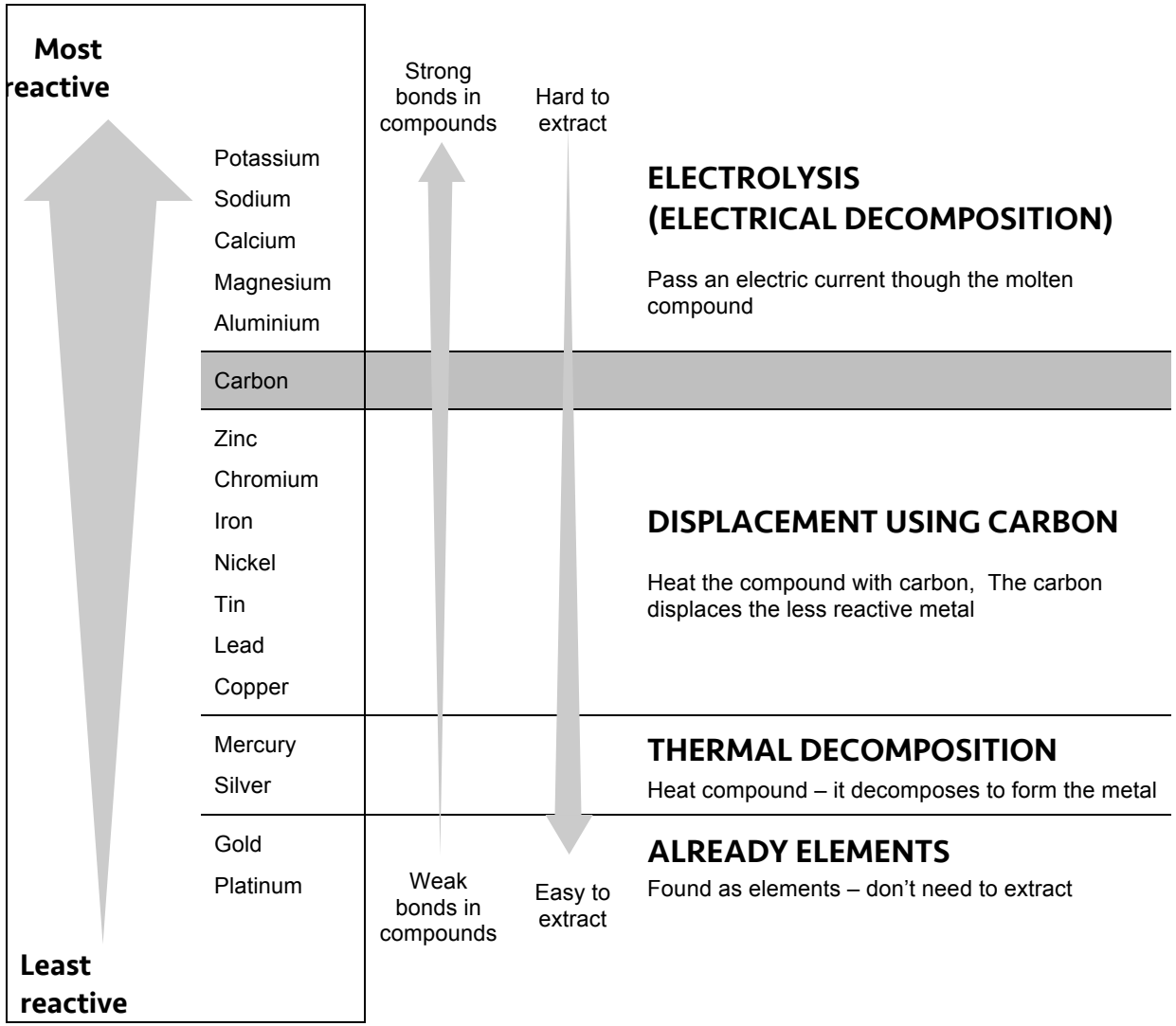
Reduction = loss of oxygen and/or gain of electrons.

Most ores contain **METAL OXIDES**. To extract the metal from the metal oxide, the oxygen is removed. Reactions that remove oxygen are called **reduction reactions**.

e.g. $Al_2O_3 \rightarrow Al$

However, when all metals are extracted, metal ions in the compounds gain electrons to form metal atoms. This means that all extraction reactions involve **reduction**.

e.g. $NaCl \rightarrow Na$ $(Na^+ + e^- \rightarrow Na)$



Questions

1) Most metals are extracted from ores.

   a) Why does gold not need to be extracted from ores?

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   b) Iron is extracted from an ore. What is an ore?

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2) Calcium is extracted from calcium chloride by electrolysis.

   a) Explain why calcium cannot be extracted by heating calcium chloride with carbon.

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   b) Explain why this extraction involves a reduction reaction.

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3) One method of extracting zinc involves the reaction of zinc oxide with carbon. Explain, both in terms of oxygen and electrons, why this extraction is involves reduction.

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4) Lead is extracted by the reduction of lead oxide by heating with carbon:

$$PbO + C \rightarrow Pb + CO$$

   a) Explain why lead can be extracted by heating with carbon.

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   b) Explain why this is a redox reaction.

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