

Redox Reactions



<http://www.quickmeme.com/meme/35srgk>

Outcomes:

- 1-08 Define oxidation and reduction. Include: gain & loss of electrons, oxidizing and reducing agents.
- 1-09 Determine the oxidation numbers for atoms in compounds and ions.
- 1-10 Identify and describe reactions as redox and non-redox.

Identifying Redox Reactions:

Recall that redox reactions involve the transfer of **ELECTRONS**.

In all redox reactions there must be an element **GAINING** electrons and an element **LOSING** electrons.

→ There is always an **OXIDATION** and a **REDUCTION** reaction.

The **GAIN** in electrons must **EQUAL** the **LOSS** of electrons.

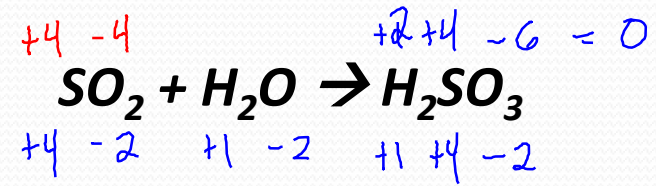
→ Electrons cannot magically **APPEAR** or **DISAPPEAR**.

We can follow the transfer of electrons by looking at the **OXIDATION NUMBERS** of the reactants and products.

→ If there is **NO CHANGE**, then it is **NOT** a redox reaction.

Example 1:

Is the following reaction a redox reaction?



Not Redox

Steps:

→ Assign oxidation numbers to each atom:

→ Check to see if there is a change in oxidation numbers.

Example 2 (con't):

The reaction:



IS a redox reaction since the oxidation numbers of Cu and Ag CHANGE.

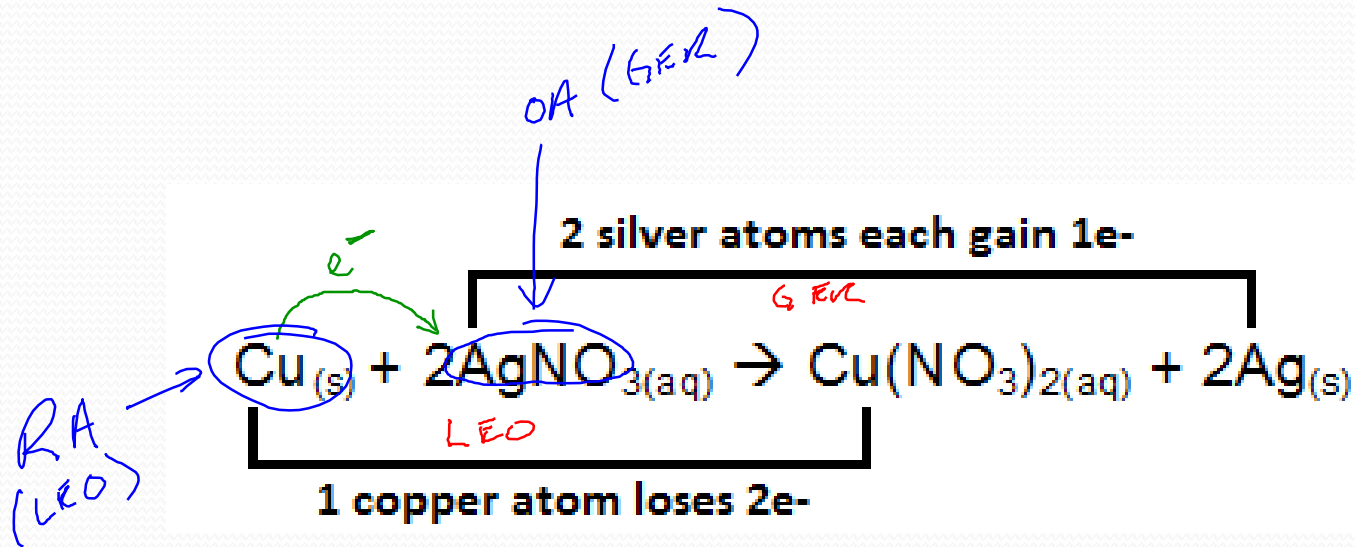
- Copper is OXIDIZED → it's oxidation number becomes more POSITIVE (LEO)
- Silver is REDUCED → it's oxidation number becomes more NEGATIVE (GER)

Copper – Silver Nitrate Reaction

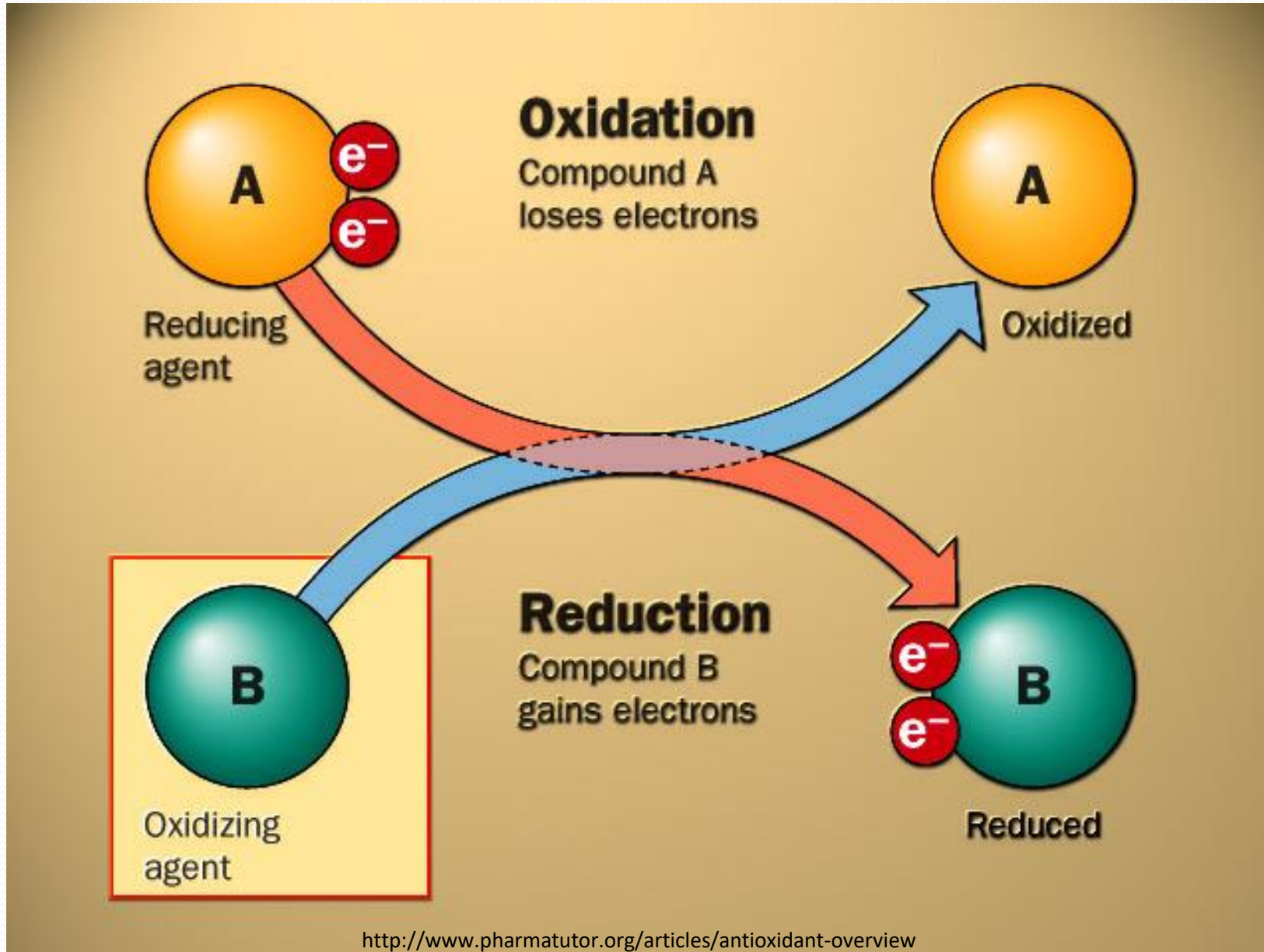
Oxidizing and Reducing Agents:

- Any substance that **CAUSES** the **OXIDATION** of another substance is an **OXIDIZING AGENT**
- Any substance that **CAUSES** the **REDUCTION** of another substance is a **REDUCING AGENT**

In the previous example, **AgNO₃** is the **OXIDIZING AGENT** and **Cu** is the **REDUCING AGENT**.

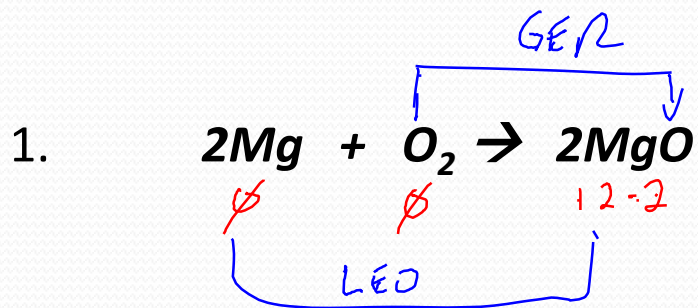


Oxidizing and Reducing Agents:



Redox Reaction Examples:

Determine the substance being oxidized, the substance being reduced, the oxidizing agent and the reducing agent for the following reaction:



Substance oxidized \rightarrow Mg

Substance reduced \rightarrow O₂

Oxidizing Agent \rightarrow O₂

Reducing Agent \rightarrow Mg

