

redox.

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## REDOX

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### what is redox?

**redox** = **reduction** + **oxidation** happening **at the same time**

Remember **OIL RIG**:

- **Oxidation Is Loss** of electrons 
- **Reduction Is Gain** of electrons 

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### oxidation vs reduction (3 ways to define)

| Method             | Oxidation                | Reduction                |
|--------------------|--------------------------|--------------------------|
| 1. Electrons       | lose electrons           | gain electrons           |
| 2. Oxygen          | gain oxygen              | lose oxygen              |
| 3. Hydrogen        | lose hydrogen            | gain hydrogen            |
| 4. Oxidation State | increase in ox.<br>state | decrease in ox.<br>state |

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very good notes

redox.

## **oxidation state (aka oxidation number)**

**what it is:** number showing how many electrons gained/lost

| element type                                          | ox. state         |
|-------------------------------------------------------|-------------------|
| pure element (e.g. O <sub>2</sub> , Cl <sub>2</sub> ) | <b>0</b>          |
| ion (e.g. Na <sup>+</sup> , Cl <sup>-</sup> )         | same as charge    |
| O in compound                                         | usually <b>-2</b> |
| H in compound                                         | usually <b>+1</b> |

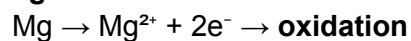
👁️ if ox. state increases → **oxidation**

👁️ if ox. state decreases → **reduction**

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## **half equations**

**e.g.**



💡 always balance atoms AND charge

💡 electrons must appear on correct side (left = gain, right = loss)

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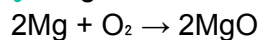
## **spotting redox in equations**

**step 1:** assign oxidation states

**step 2:** compare before & after

**step 3:** label what's oxidised + reduced

 **e.g.**



Mg: 0 → +2 → **oxidised**

O: 0 → -2 → **reduced**

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very good notes

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### **common redox reactions:**

- **displacement** (reactive metal kicks out less reactive one)
  - **combustion** (burn = oxidation)
  - **rusting** (iron oxidised)
  - **electrolysis** (electrons move = redox party)
  - **acid + metal** (metal oxidised,  $H^+$  reduced to  $H_2$  gas)
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### **electrolysis = redox event**

at **cathode (-)**: **reduction** happens (positive ions gain  $e^-$ )

at **anode (+)**: **oxidation** happens (negative ions lose  $e^-$ )

 tip: **“PANIC” = Positive Anode, Negative Is Cathode**

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