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Class - 10

Chapter - 3

Metals And Non-Metals

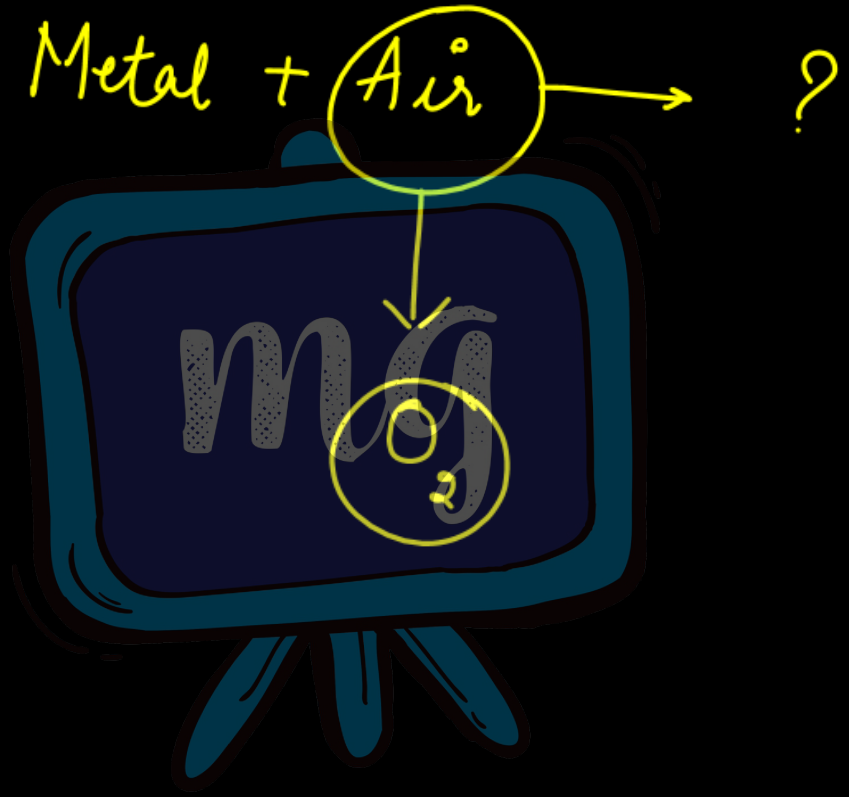
Part-2

Chemical Properties of Metal

Disha Didi (DD)

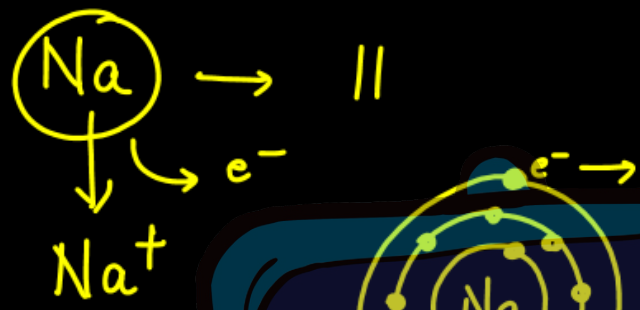
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K^+ | Mg^{+2} | Ca^{+2}

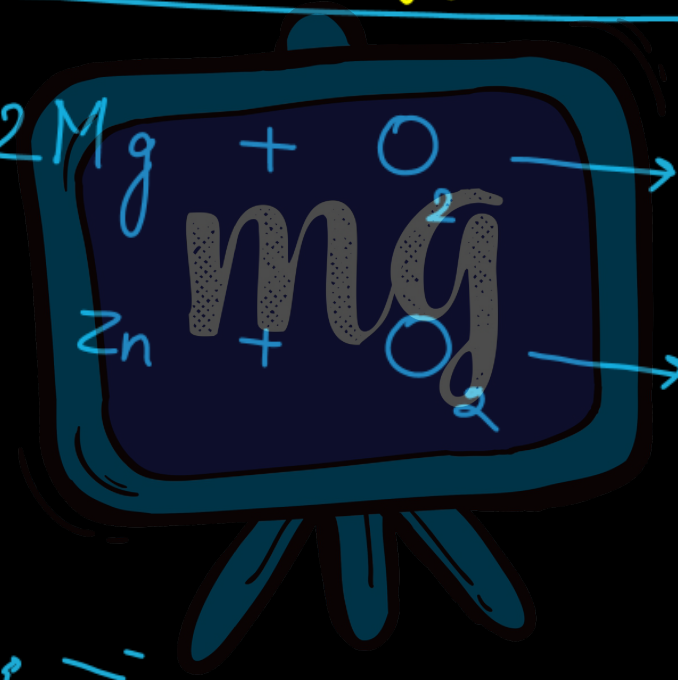
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ELECTROPOSITIVE

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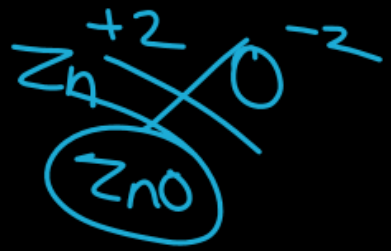
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Metal + Oxygen → Metal Oxide



1) $2Mg + O_2 \rightarrow 2MgO$

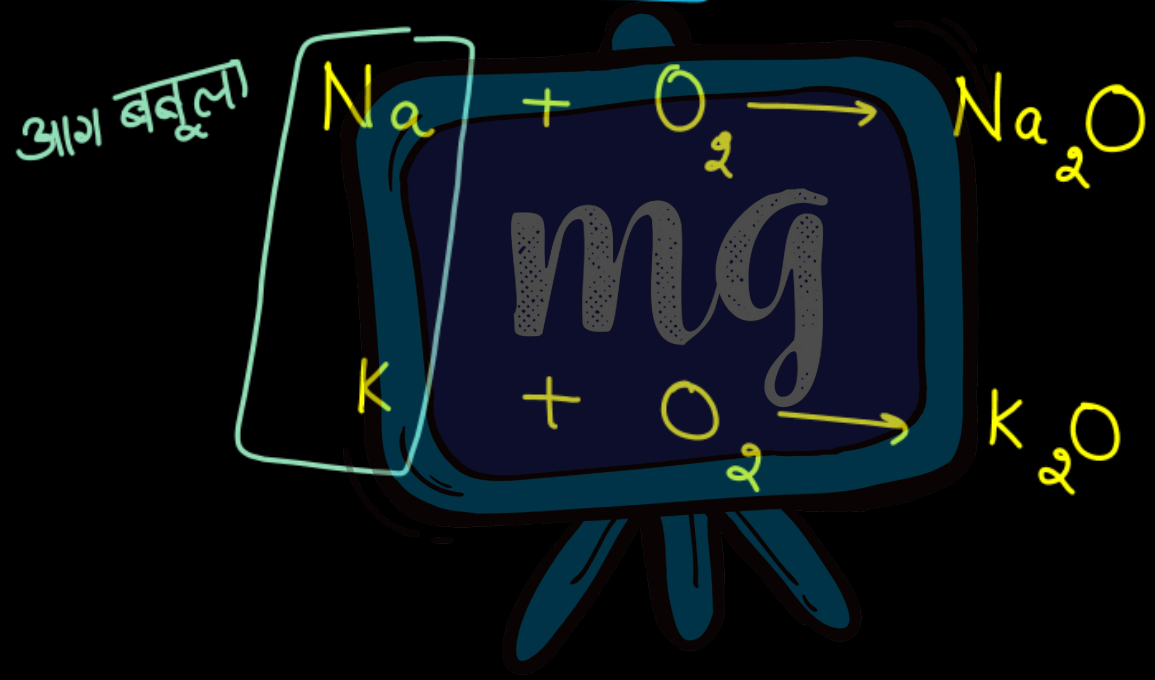
2) $Zn + O_2 \rightarrow ZnO$



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Alkali Metals :



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$2Cu + O_2 \longrightarrow 2CuO$ (Copper(II) Oxide)

Black

Fe + O_2 → Sprinkles

iron filling

Mg

Ag , Au → △ ↑↑

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Chemical Properties of Metals

A. Burning of Metal in Air :

Most metals combine with oxygen to metal oxides —

- Metal + Oxygen → Metal oxide.

$2Cu + O_2 \rightarrow 2CuO$

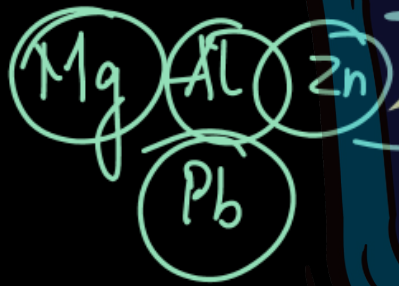
$2Zn + O_2 \rightarrow 2ZnO$

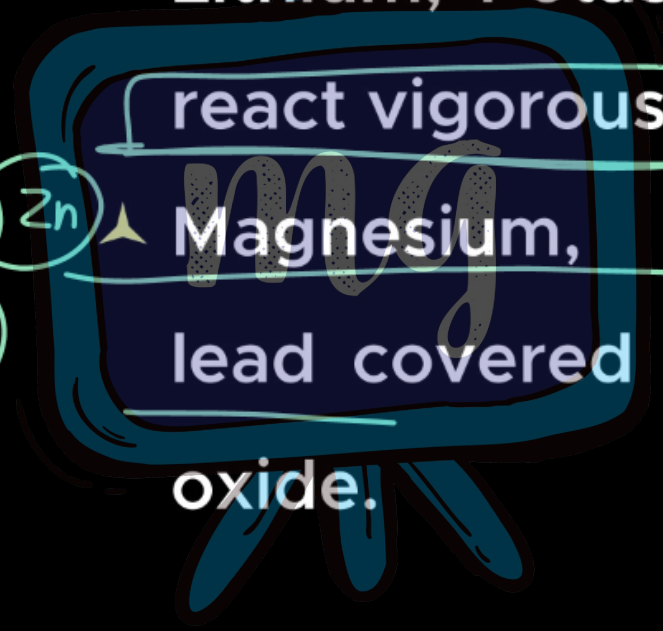
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Reactivity of Different Metals —

- Lithium, Potassium and Sodium react vigorously.
- Magnesium, aluminium, zinc, lead covered with thin layer of oxide.





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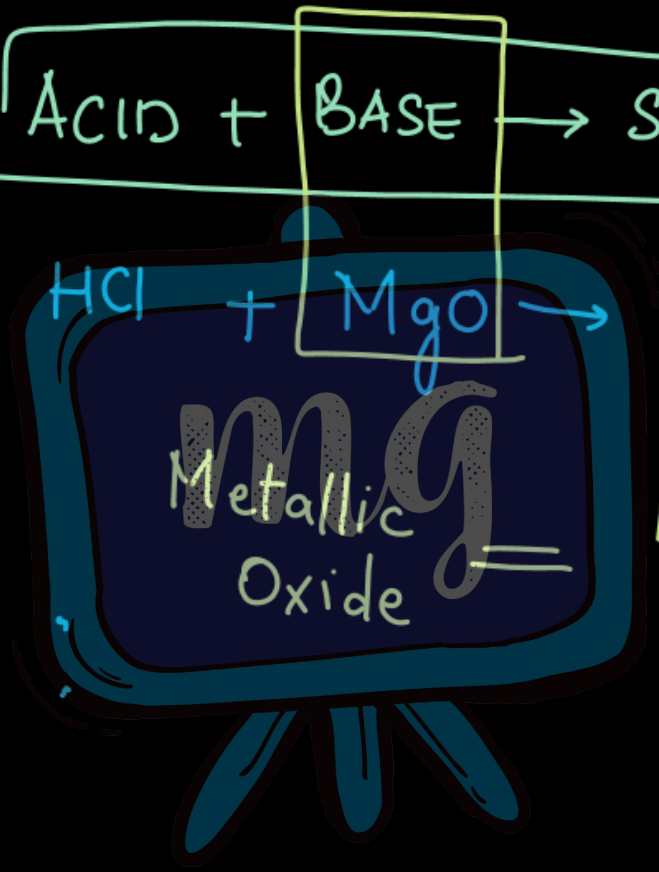
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- Iron does not burn on heating, but iron filling burn vigorously.
- Copper does not burn, but hot metal is covered with a black coloured layer of Cu(II)O.
- Silver and gold do not react even at high temperature.

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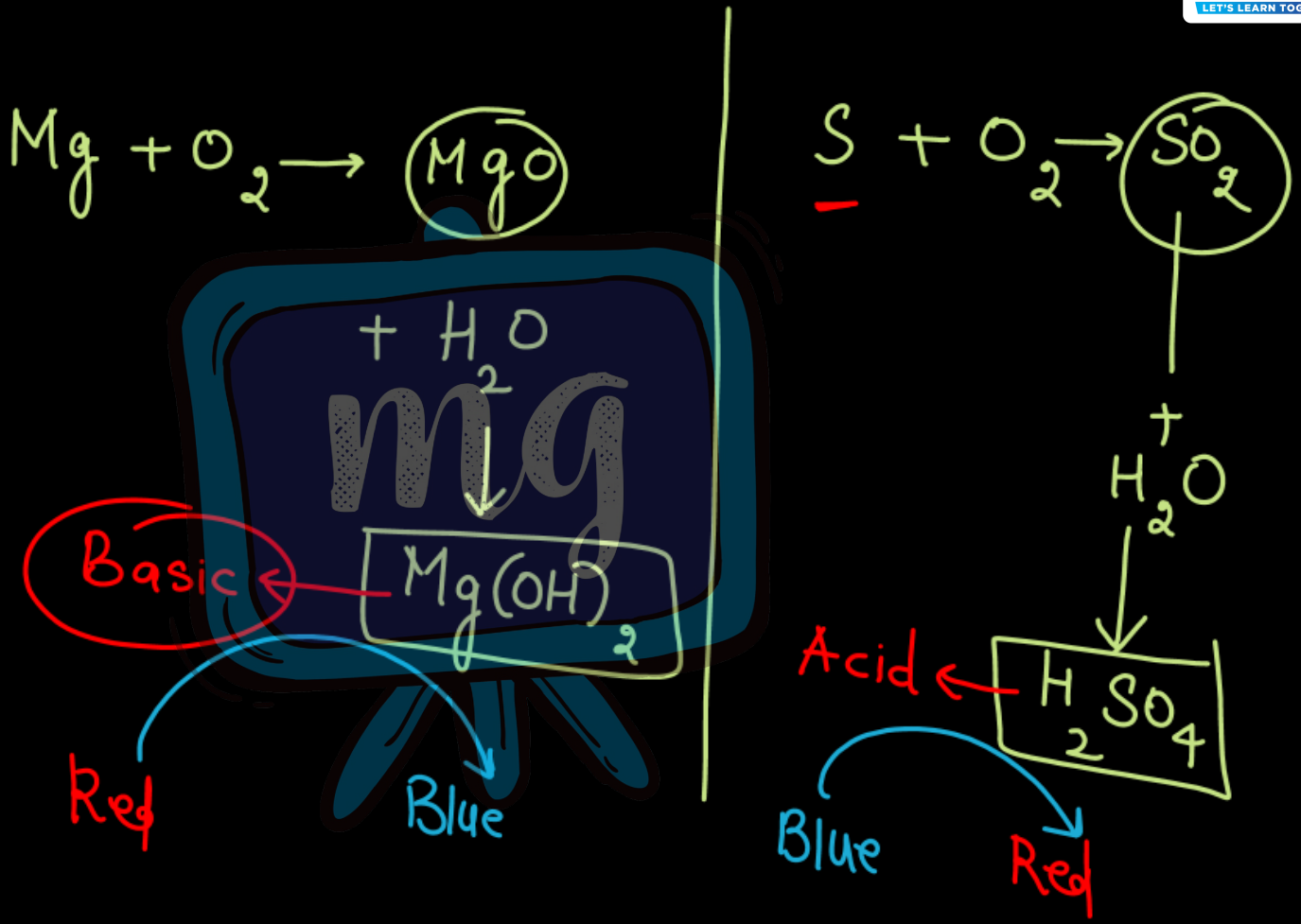
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ACID + BASE → SALT + WATER



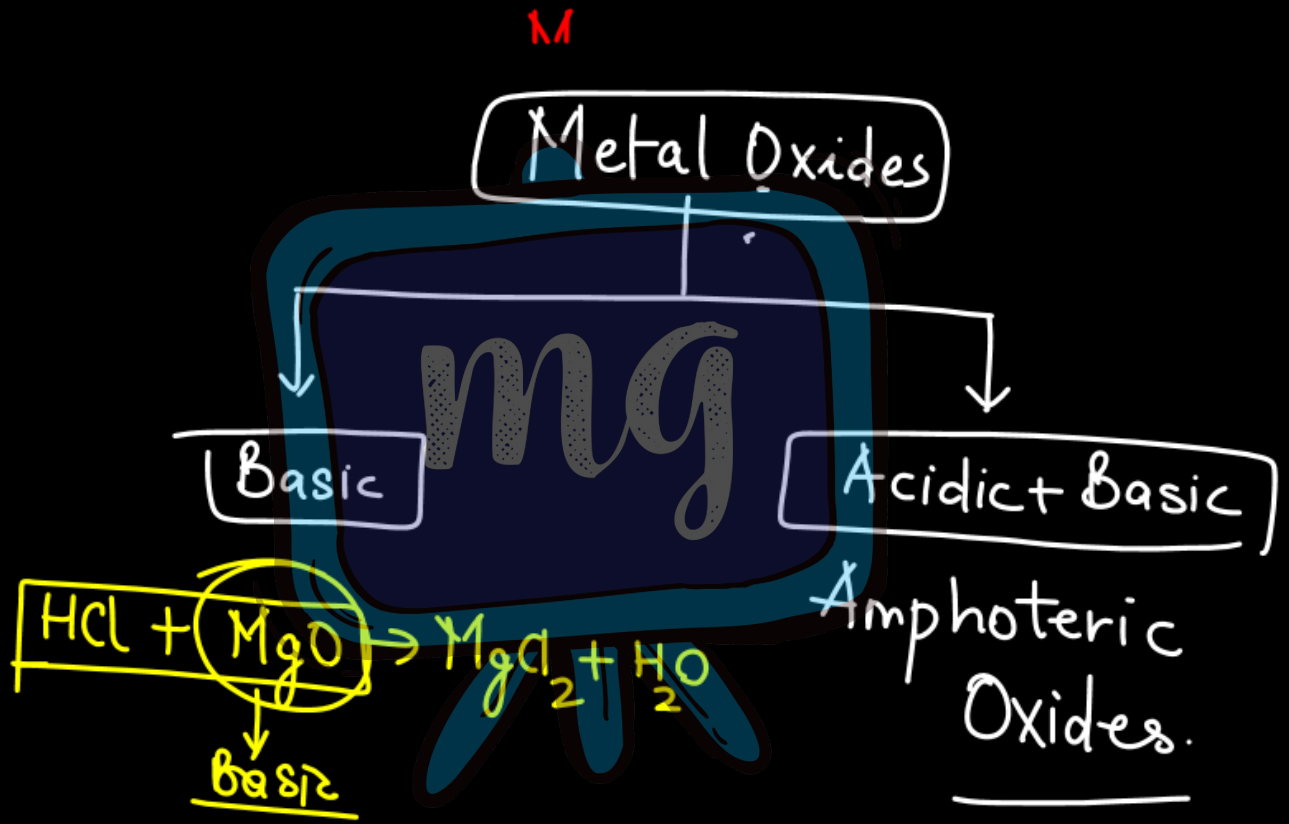
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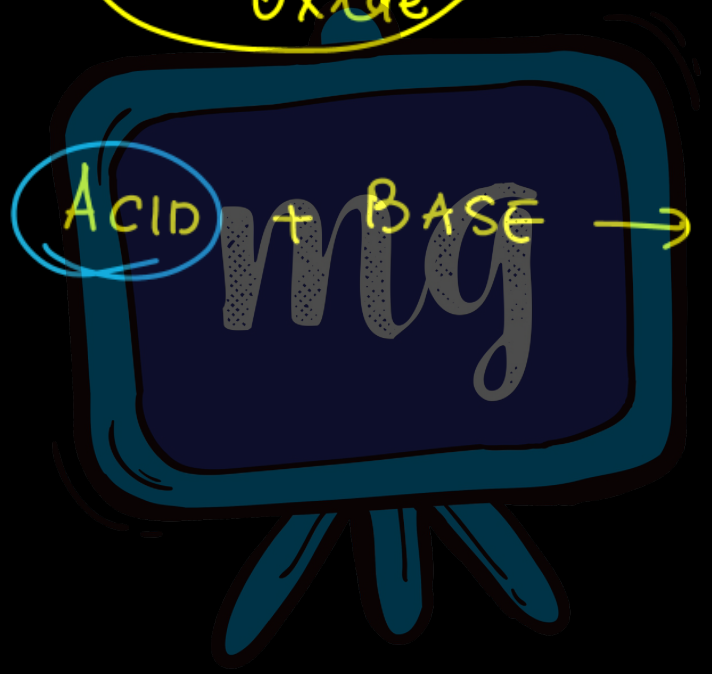
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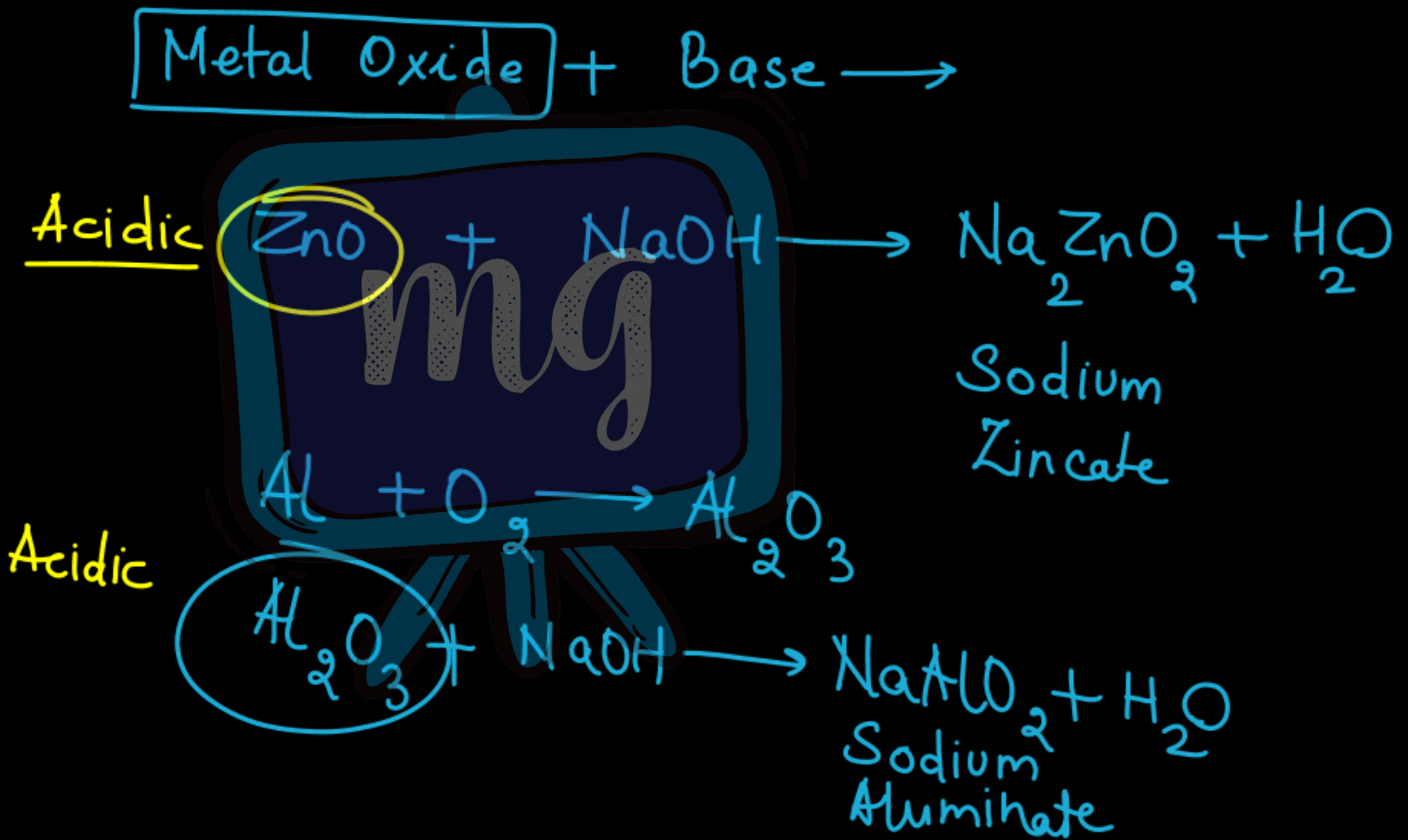
Amphoteric Oxide → Alkali Metal



ACID + BASE → Salt + H_2O

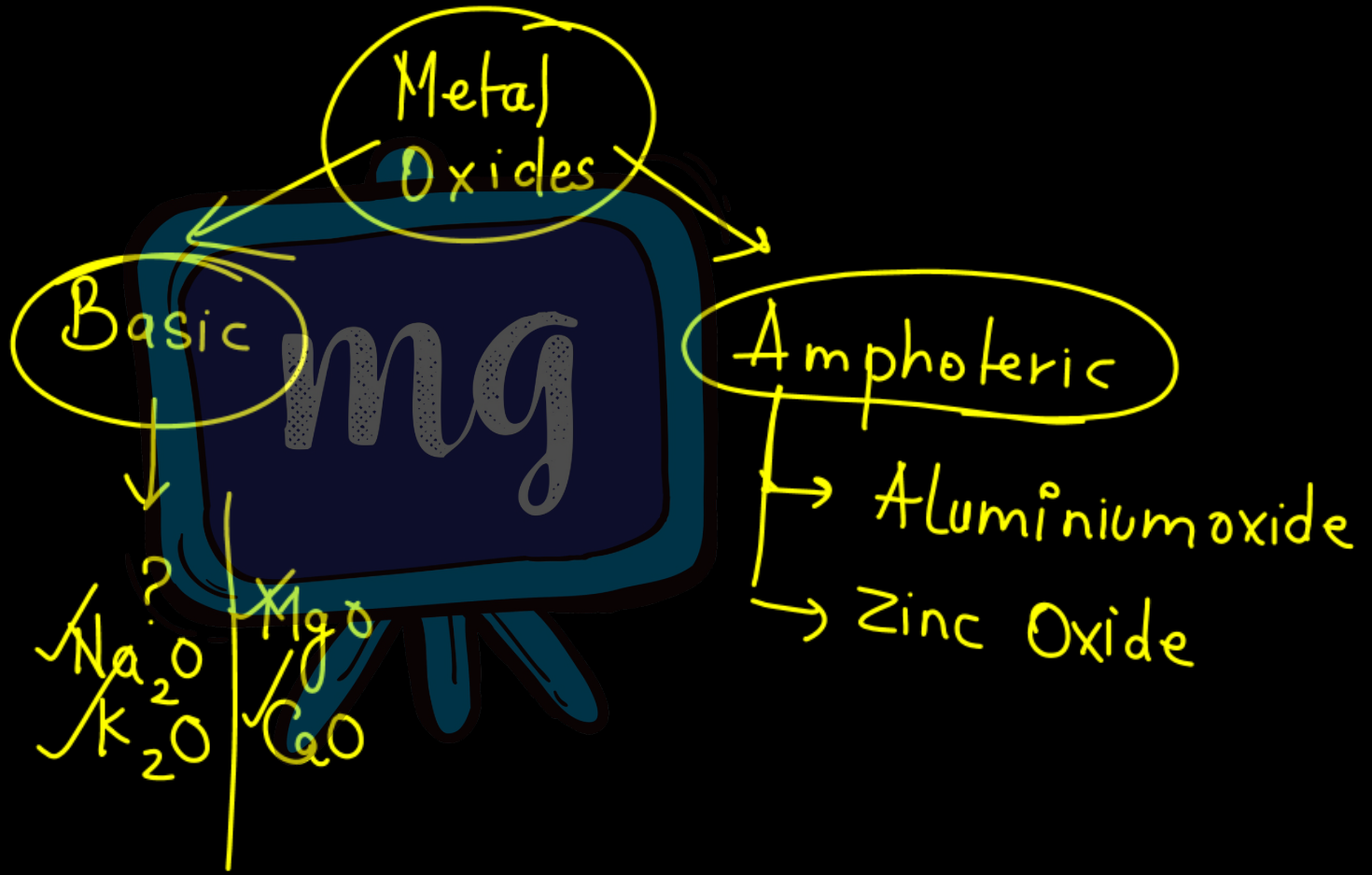
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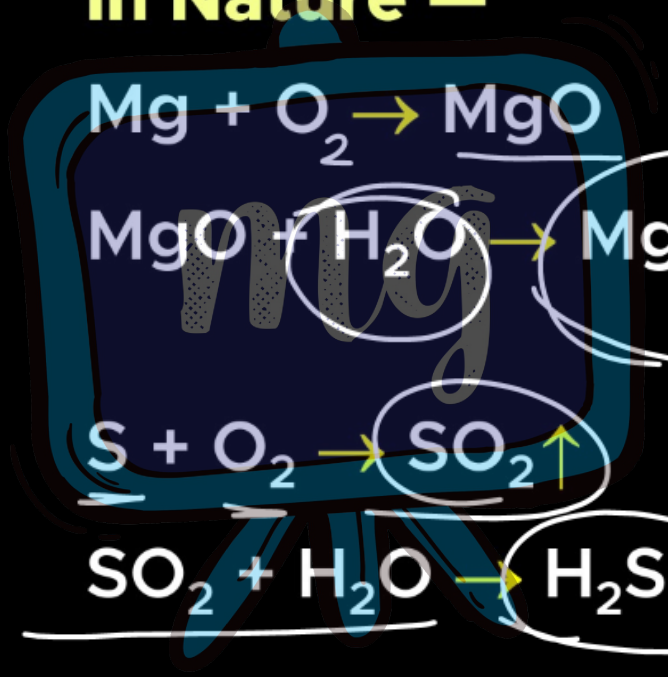


1.

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Generally Metal Oxides are Basic in Nature —



$Mg + O_2 \rightarrow MgO$

$MgO + H_2O \rightarrow Mg(OH)_2$ basic

$S + O_2 \rightarrow SO_2 \uparrow$

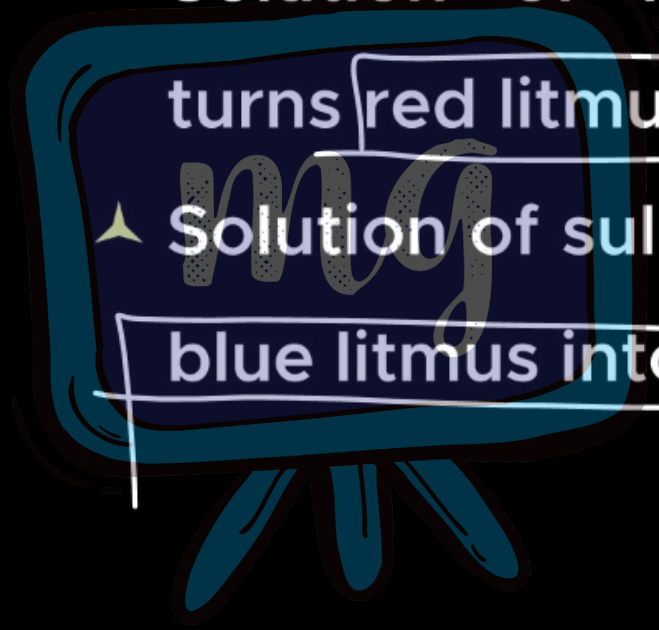
$SO_2 + H_2O \rightarrow H_2SO_4$ acidic

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Observation —

- Solution of magnesium oxide turns red litmus into blue.
- Solution of sulphur dioxide turns blue litmus into red.

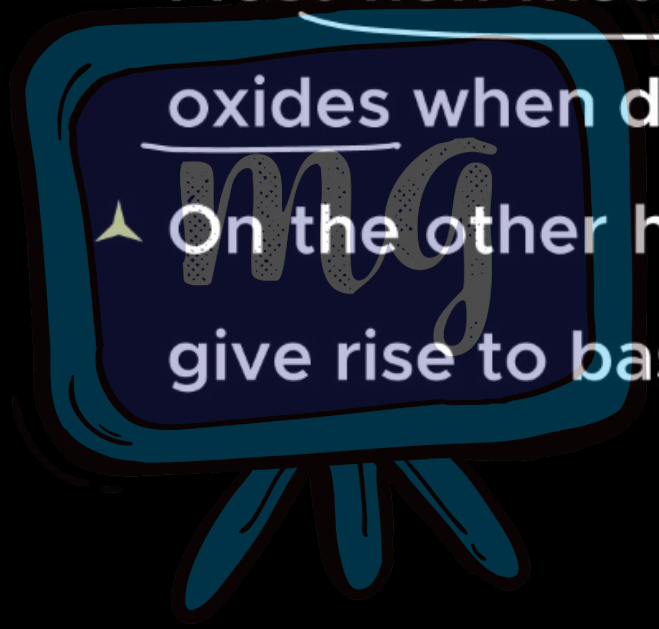


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Conclusion —

- Most non-metals produce acidic oxides when dissolved in water.
- On the other hand, most metals, give rise to basic oxides.



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Amphoteric Oxide —

- Some metal oxides, show both acidic as well as basic behaviour.
- Such metal oxides which react with both acids as well as bases to produce salts and water are known as amphoteric oxides.

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Example —

1. Al_2O_3 with acid :

$$Al_2O_3 + 6HCl \rightarrow 2AlCl_3 + 3H_2O$$

Al_2O_3 : Base

$2AlCl_3$: Salt

2. Al_2O_3 with base :

$$Al_2O_3 + 2NaOH \rightarrow 2NaAlO_3 + H_2O$$

Al_2O_3 : Acidic

$2NaAlO_3$: Salt
Sodium Aluminate

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3. ZnO with acid :

$ZnO + 2HCl \rightarrow ZnCl_2 + H_2O$

Base

Salt

4. ZnO with base :

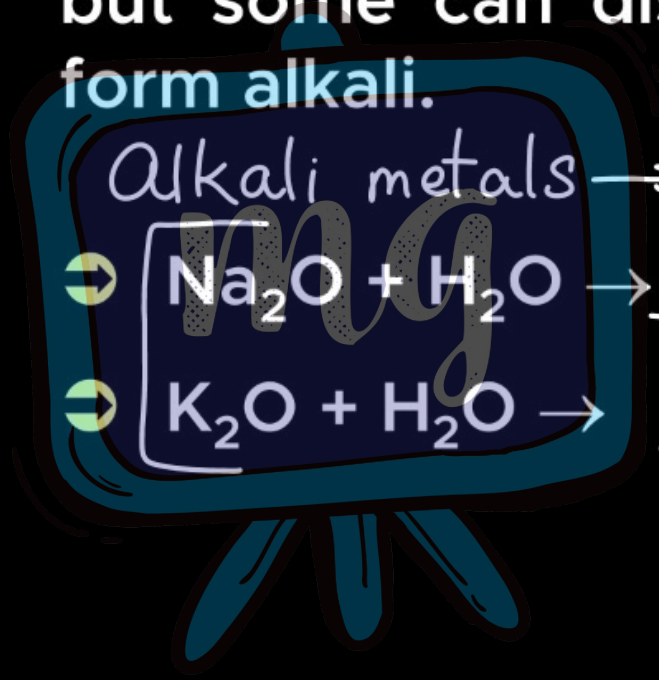
$ZnO + 2NaOH \rightarrow Na_2ZnO_2 + H_2O$

Acidic

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Metal oxides are insoluble in water but some can dissolve in water to form alkali.



Alkali metals → oxides.

- $Na_2O + H_2O \rightarrow NaOH(aq)$
- $K_2O + H_2O \rightarrow KOH$

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Anodising —

- Anodising is a process of forming a thick oxide layer of aluminium.
- Aluminium develops a thin oxide layer when exposed to air.
- This aluminium oxide coat makes it resistant to further corrosion.

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