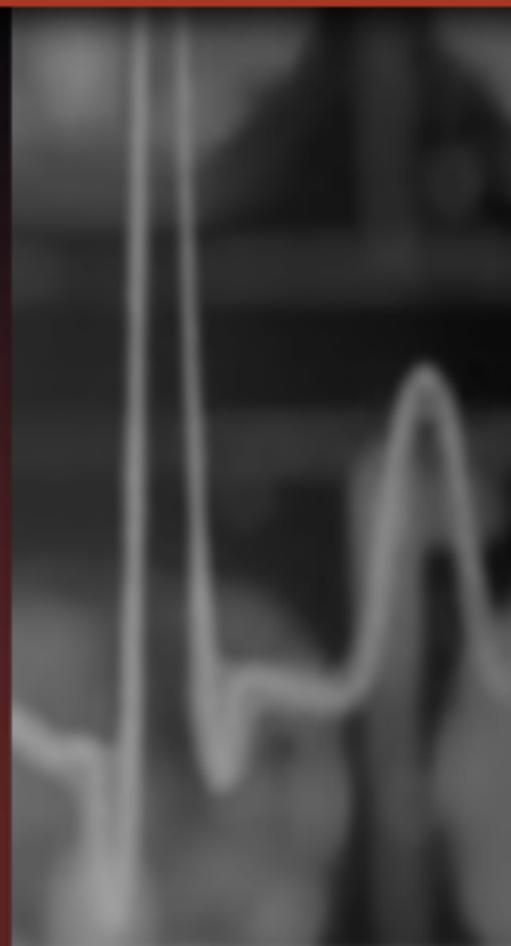


Order of Reactivity



Order of Reactivity

- Two substances can react in a similar chemical reaction but the *reactivity* of such a reaction is depended on the type of substance involved.

Order of Reactivity

- Chemists can list metals according to how quickly they undergo chemical reactions, such as burning or dissolving in acids.
- The result is called a reactivity series.



Order of Reactivity

- An element that is located high in the chemical reactivity series can react explosively with another substance
- Elements located further down the list may only react at a slow rate even when heated

Order of Reactivity

- The more reactive metal can take their place (or displace them) in various compounds or in solution.

Order of Reactivity

- In some reactions, however, such as reduction reactions, the order of reactivity is reversed.

Displacement reaction

- Chemists use the reactivity series to predict what will happen in a type of chemical reaction called a displacement reaction.
- These reactions are involved in the extraction of many metals from their ores.

Carbon and Hydrogen

- Carbon and hydrogen are often included in the reactivity series even though they are non-metals.
- Carbon is included because this helps to explain what happens in the extraction of iron in a blast furnace.
- Hydrogen is included because any metal below it will not react with dilute acids.

Reactivity Series (or Activity Series) of Metals

		Potassium	K	(Most reactive metal)	
		Sodium	Na		
		Calcium	Ca		
These metals are more reactive than hydrogen	—	Magnesium	Mg		
		Aluminium	Al		
		Zinc	Zn		
		Iron	Fe		
		Tin	Sn		
		Lead	Pb		
				[Hydrogen]	[H]
These metals are less reactive than hydrogen	—	Copper	Cu		
		Mercury	Hg		
		Silver	Ag		
		Gold	Au		
				(Least reactive metal)	

Decreasing chemical reactivity

Reaction with Cold Water

- Only metals above *magnesium* react with cold water to form the metal hydroxide and hydrogen.
 - potassium + water \longrightarrow potassium hydroxide solution + hydrogen
 - Potassium
 - Sodium
 - Calcium

Reaction with Hot Water

- Magnesium reacts slowly with hot water to give hydrogen and magnesium hydroxide.

Reaction with Steam

- Metals at the mid positions of the reactivity series react with steam to form the *metal oxide* and *hydrogen*
 - zinc + steam \longrightarrow zinc oxide + hydrogen
 - Magnesium
 - Aluminium
 - Zinc
 - Iron

Reaction with Oxygen

- Metals become less reactive when moving down the reactivity series.
- When metals react with oxygen the metal oxides are formed.

Potassium + oxygen \longrightarrow potassium superoxide

- Metal oxides are ***basic*** which means that they form an alkaline solution when dissolved in water

Reaction with Diluted Acids

- Metals above the copper in the reactivity series can react with dilute acids to form metal salts and hydrogen.

sodium + dilute hydrochloric acid \longrightarrow sodium chloride + hydrogen

- The higher up the series the more vigorous the metals will react

- 'Please Stop Calling My Zebra In Class'

Try These Out

- Copper + Nickel Sulfate
- Iron + Nickel Sulfate
- Iron + Copper Sulfate
- Nickel + Iron Sulfate
- Copper + Iron Sulfate