

# Acid reactions

- overall and ionic equations

Hydrogen	H <sup>+</sup>	Chloride	Cl <sup>-</sup>
Sodium	Na <sup>+</sup>	Bromide	Br <sup>-</sup>
Silver	Ag <sup>+</sup>	Fluoride	F <sup>-</sup>
Potassium	K <sup>+</sup>	Iodide	I <sup>-</sup>
Lithium	Li <sup>+</sup>	Hydroxide	OH <sup>-</sup>
Ammonium	NH <sub>4</sub> <sup>+</sup>	Nitrate	NO <sub>3</sub> <sup>-</sup>
Barium	Ba <sup>2+</sup>	Oxide	O <sup>2-</sup>
Calcium	Ca <sup>2+</sup>	Sulphide	S <sup>2-</sup>
Copper(II)	Cu <sup>2+</sup>	Sulphate	SO <sub>4</sub> <sup>2-</sup>
Magnesium	Mg <sup>2+</sup>	Carbonate	CO <sub>3</sub> <sup>2-</sup>
Zinc	Zn <sup>2+</sup>	Hydrogencarbonate	HCO <sub>3</sub> <sup>-</sup>
Lead	Pb <sup>2+</sup>		
Iron(II)	Fe <sup>2+</sup>		
Iron(III)	Fe <sup>3+</sup>		
Aluminium	Al <sup>3+</sup>		

Table 1  
Valency of common ions

Reaction	
Sulphuric acid solution and aqueous sodium carbonate.	Overall : $\text{H}_2\text{SO}_4(\text{aq}) + \text{Na}_2\text{CO}_3(\text{aq}) \rightarrow \text{Na}_2\text{SO}_4(\text{aq}) + \text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$ ionic : $2\text{H}^+(\text{aq}) + \text{CO}_3^{2-}(\text{aq}) \rightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$
Nitric acid solution and lithium metal	Overall : $2\text{HNO}_3(\text{aq}) + 2\text{Li}(\text{s}) \rightarrow \text{H}_2(\text{g}) + 2\text{LiNO}_3(\text{aq})$ ionic : $2\text{H}^+(\text{aq}) + 2\text{Li}(\text{s}) \rightarrow \text{H}_2(\text{g}) + 2\text{Li}^+(\text{aq})$
Hydrochloric acid solution and magnesium sulphide powder	Overall : $2\text{HCl}(\text{aq}) + \text{MgS}(\text{s}) \rightarrow \text{H}_2\text{S}(\text{g}) + \text{MgCl}_2(\text{aq})$ ionic : $2\text{H}^+(\text{aq}) + \text{MgS}(\text{s}) \rightarrow \text{H}_2\text{S}(\text{g}) + \text{Mg}^{2+}(\text{aq})$
Sulphuric acid solution and sodium oxide powder.	Overall : $\text{H}_2\text{SO}_4(\text{aq}) + \text{Na}_2\text{O}(\text{s}) \rightarrow \text{Na}_2\text{SO}_4(\text{aq}) + \text{H}_2\text{O}(\text{l})$ ionic : $2\text{H}^+(\text{aq}) + \text{Na}_2\text{O}(\text{s}) \rightarrow 2\text{Na}^+(\text{aq}) + \text{H}_2\text{O}(\text{l})$
Nitric acid solution and aqueous calcium hydroxide.	Overall : $2\text{HNO}_3(\text{aq}) + \text{Ca}(\text{OH})_2(\text{s}) \rightarrow 2\text{H}_2\text{O}(\text{l}) + \text{Ca}(\text{NO}_3)_2(\text{aq})$ ionic : $\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l})$
Hydrochloric acid solution and aqueous sodium sulphite.	Overall : $2\text{HCl}(\text{aq}) + \text{Na}_2\text{S}(\text{s}) \rightarrow \text{H}_2\text{S}(\text{g}) + 2\text{NaCl}(\text{aq})$ ionic : $2\text{H}^+(\text{aq}) + \text{S}^{2-}(\text{aq}) \rightarrow \text{H}_2\text{S}(\text{g})$
Sulphuric acid solution and solid sodium hydroxide	Overall : $\text{H}_2\text{SO}_4(\text{aq}) + 2\text{NaOH} \rightarrow \text{Na}_2\text{SO}_4(\text{aq}) + 2\text{H}_2\text{O}(\text{l})$ ionic : $\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l})$
Nitric acid solution and aqueous sodium carbonate.	Overall : $2\text{HNO}_3(\text{aq}) + \text{Na}_2\text{CO}_3(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l}) + 2\text{NaNO}_3(\text{aq}) + \text{CO}_2(\text{g})$ ionic : $2\text{H}^+(\text{aq}) + \text{CO}_3^{2-}(\text{aq}) \rightarrow \text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l})$