

REACTIONS (IN AQUEOUS SOLUTIONS)

I. PRECIPITATION (DOUBLE REPLACEMENT)

→ insoluble product

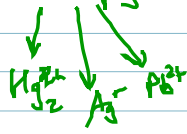
SOLUBILITY ⇒ maximum amount of a solid that will dissolve

SOLUBILITY RULES

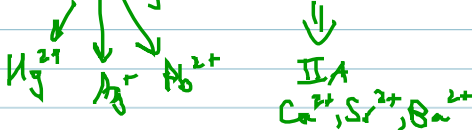
A) SOLUBLE

- alkali metal (IA) salt
- ammonium (NH_4^+) salts
- NO_3^- , HCO_3^- , ClO_3^-
- halides (EXCEPT: Hg_2^{2+} , Ag^+ , Pb^{2+})
- sulfates (EXCEPT: Hg_2^{2+} , Ag^+ , Pb^{2+} , Ca^{2+} , Sr^{2+} , Ba^{2+})
IIA

HAPPY halides



HAPPY sulfates 2



IONIC COMPOUNDS WILL DISSOLVE IN H_2O
 IF IT RESULTS IN OVERALL LOWER ENERGY

→ INSOLUBLE

B) S^{2-} , OH^- , O^{2-} , PO_4^{3-} , CrO_4^{2-} , CO_3^{2-} } EXCEPTIONS
 IA salts, NH_4^+ , $\text{Ba}(\text{OH})_2$

SKOP for a CHROME CAR



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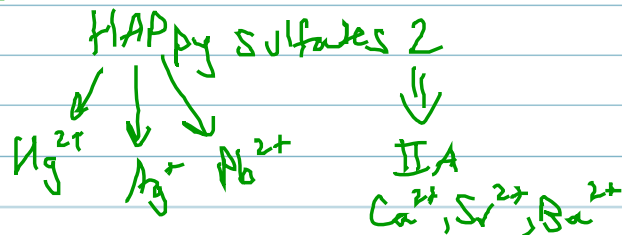
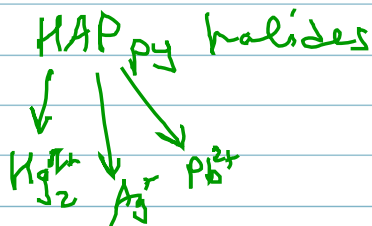
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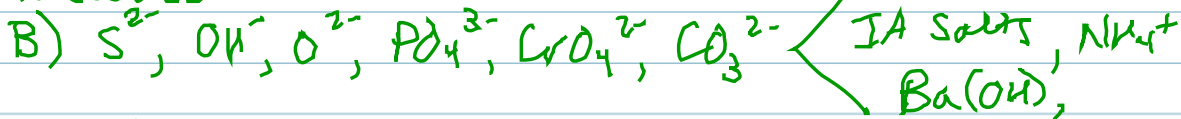
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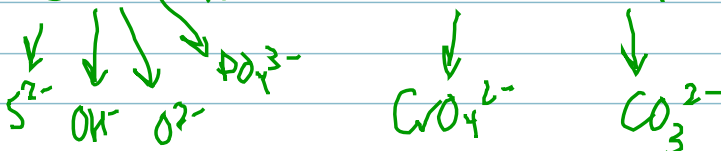


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IF IT RESULTS IN OVERALL LOWER ENERGY

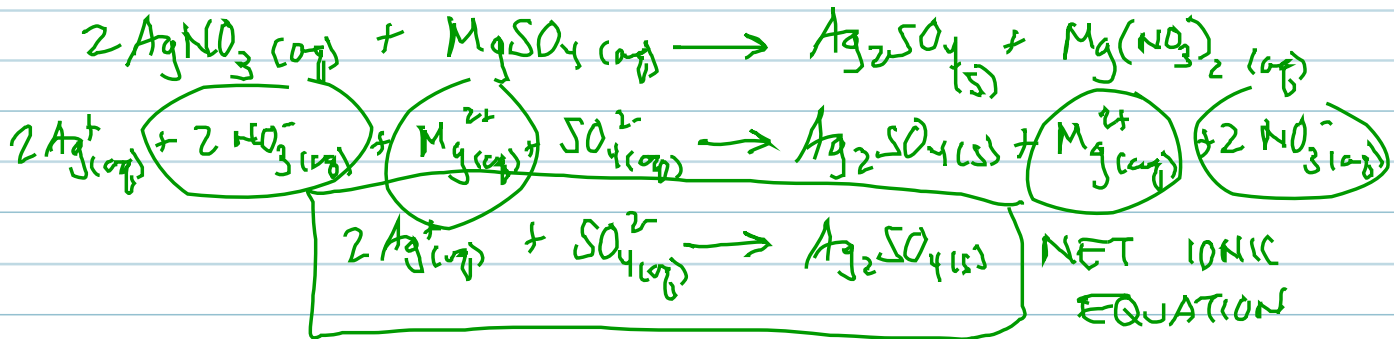
→ INSOLUBLE



SHOP for a CHROME CAR



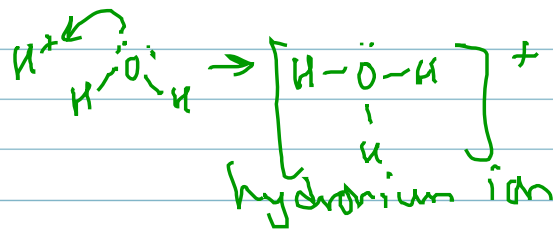
a solution of silver nitrate is mixed with a solution of magnesium sulfate



II. ACID-BASE REACTIONS

~~Arrhenius~~ ~~Strong~~ ACIDS $\rightarrow \text{H}^+$ } STRONG!
 Arrhenius BASES $\rightarrow \text{OH}^-$

Bronsted/Lowry \Rightarrow ACID $\rightarrow \text{H}^+$ donor
 BASE $\rightarrow \text{H}^+$ acceptor

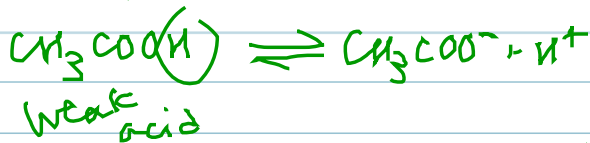
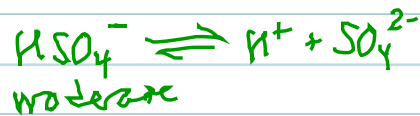
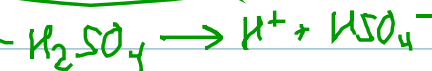


MONOPROTIC

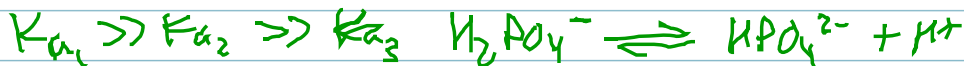
HCl, HBr, HI
 HNO₃
 HClO₄

STRONG

DIPROTIC

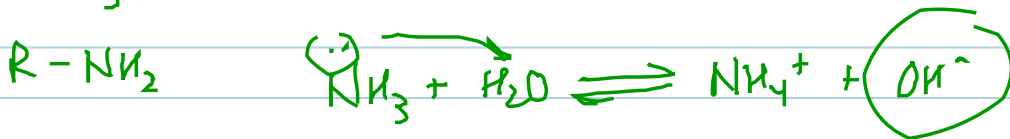


TRIPROTIC



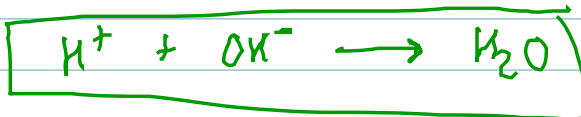
SOLUBLE $\text{OH}^- \Rightarrow$ STRONG BASES in aqueous sol'n

NH_3 B/L bases

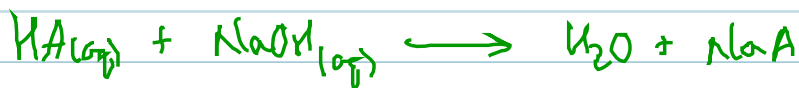


NEUTRALIZATION

① STRONG ACID + STRONG BASE \longrightarrow H_2O + SALT



② WEAK ACID \longrightarrow NOT MUCH IONIZATION \longrightarrow DO NOT WRITE AS SEPARATE IONS



③ ACID + $\underbrace{\text{CO}_3^{2-}, \text{HCO}_3^-, \text{SO}_3^{2-}, \text{S}^{2-}}_{\text{bases}} \longrightarrow$ gaseous products

