

Introduction to acids

1 Definition - Arrhenius Rule

- Hydrogen-containing covalent compound that dissolves in water to ionize H^+ as the only positive ion \rightarrow ionization (离子化)
- $HCl(aq) \rightarrow H^+ + Cl^-$
- $H_2SO_4(aq) \rightarrow 2H^+ + SO_4^{2-}$
- $[H^+] > [OH^-]$

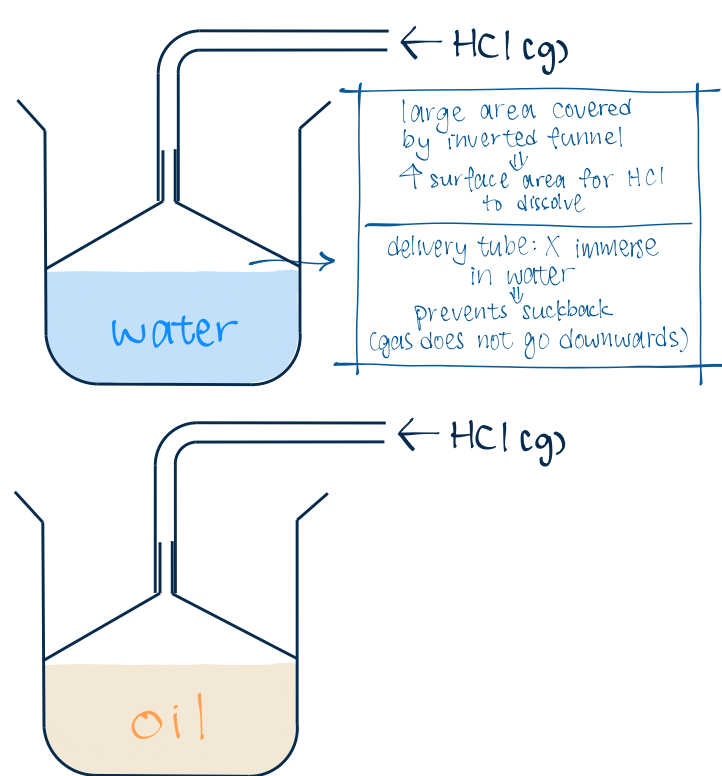
2 Acidic properties

- tastes sour
- conducts electricity (✓ mobile ions)
- reactions

3 Importance of water to acids

- acids must be dissolved in water to possess acidic properties
(Arrhenius rule: "...dissolves in water to ionize H^+ ..." \rightarrow $x \text{ water} = x \text{ } H^+$)

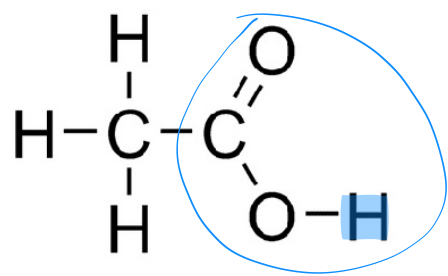
EXPERIMENT TO DEMONSTRATE WATER'S IMPORTANCE



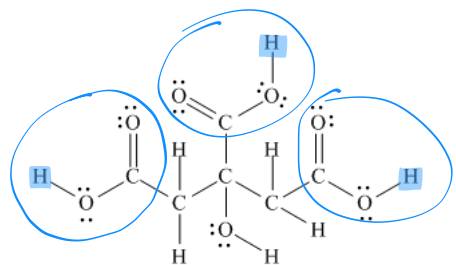
1. Pump $HCl(g)$ into water and oil respectively.
 2. Use blue litmus paper to test if the liquids are acids.
 - > water: blue \rightarrow red
 - > oil: remains blue
- \rightarrow Only HCl dissolved in water exhibits acidic properties
- 可不可以用加 Iron \rightarrow 看有没有 OC (应是 colourless gas bubbles) 的方法判断是不是 acid?
 - \rightarrow 不可以
 - \rightarrow oil - 开始也会有气泡 (泵气进液体自然会产生气泡), 但之后因 HCl 溶进油里了 (HCl 为 SMS, 并且 non-polar, like dissolves like) 气泡会消失

4 注意点

1. Dilute acids 不一定是 corrosive, 保险起见写 irritant 较好
2. 如果 acid 有 $COOH$, 则只有 $COOH$ 里面的 H 才会 ionize 成 H^+
 - \therefore acid molecule 里面 H atoms 的数量不代表 acid (completely ionize 后) 掉落 H^+ 的数量
 - eg 1. $CH_3COOH \rightleftharpoons CH_3COO^- + H^+$



- eg 2. citric acid (tribasic)



5 Acids 的分类

1. strong vs weak acids
 2. conc. vs dilute acids
 3. basicity
 4. mineral acid vs organic acid
- } 影响 pH
- obtained from minerals / living things
 - mineral acids: HCl , H_2SO_4 , HNO_3 , H_3PO_4 ...
 - organic acids: CH_3COOH (ethanoic acid), citric acid...