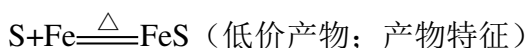


高中常见化学方程式

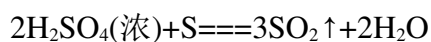
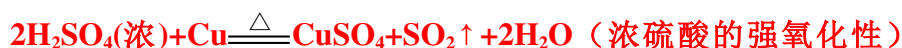
带*为非必背内容

一、体现单质的氧化性

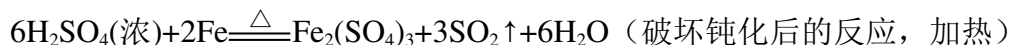
1. 非金属单质的氧化性



2. 含氧酸的氧化性



$\text{H}_2\text{SO}_4+\text{Fe}(\text{Al})$ 室温下钝化 (浓 H_2SO_4 的强氧化性)

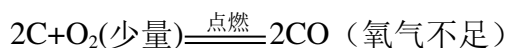


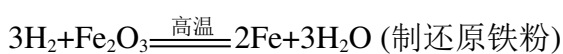
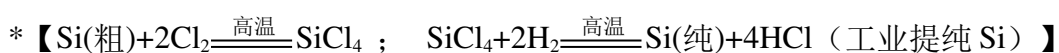
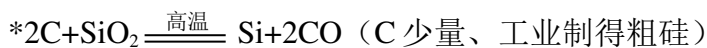
3. 高价盐的氧化性



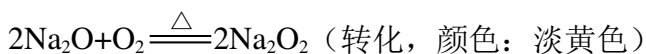
二、体现单质的还原性

1. 非金属的还原性

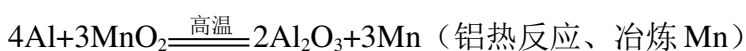
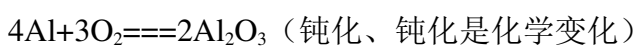
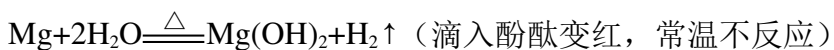
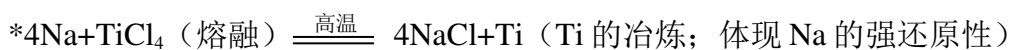


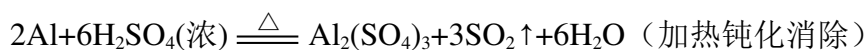


2. 金属单质 (Na、Al、Fe、Cu) 的还原性

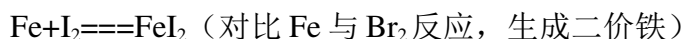
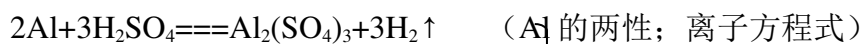


Na 的保存)

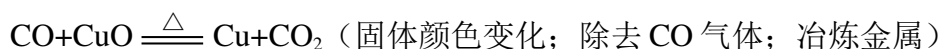
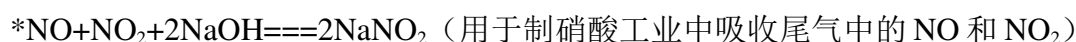
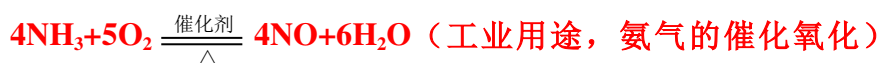
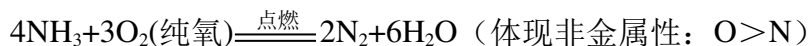
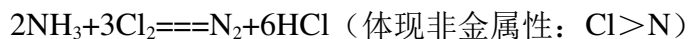
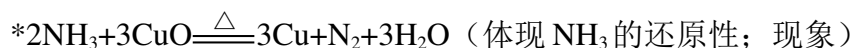
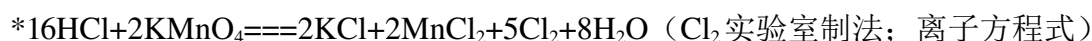
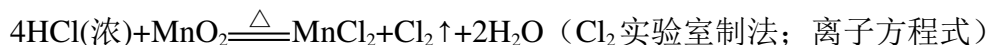


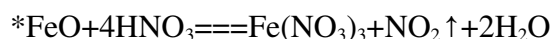


(Al、Fe 在冷、浓的 H_2SO_4 、 HNO_3 中钝化)



3. 化合物的还原性





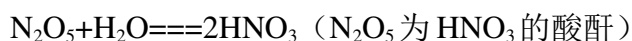
三、歧化反应



离子方程式)



四、化合、复分解反应



$\text{NH}_3+\text{HCl}===\text{NH}_4\text{Cl}$ (现象：产生白烟；互相检验)

$\text{NH}_3+\text{HNO}_3===\text{NH}_4\text{NO}_3$ (现象：白烟；互相检验)

$2\text{NH}_3+\text{H}_2\text{SO}_4===(\text{NH}_4)_2\text{SO}_4$

$\text{SO}_2+2\text{NH}_3+\text{H}_2\text{O}===(\text{NH}_4)_2\text{SO}_3$

$\text{SO}_2+(\text{NH}_4)_2\text{SO}_3+\text{H}_2\text{O}===2\text{NH}_4\text{HSO}_3$ (离子方程式；类比)

(这是硫酸厂回收 SO_2 的反应：先用氨水吸收 SO_2 ,再用 H_2SO_4 处理:

$2\text{NH}_4\text{HSO}_3+\text{H}_2\text{SO}_4===(\text{NH}_4)_2\text{SO}_4+2\text{H}_2\text{O}+2\text{SO}_2$

生成的硫酸铵作化肥, SO_2 循环作原料气)

$\text{SO}_2+\text{Ca}(\text{OH})_2===\text{CaSO}_3+\text{H}_2\text{O}$ (也可用石灰乳吸收 SO_2 ；不能用澄清石灰水鉴别 SO_2 和 CO_2 .可用品红鉴别)

$\text{SO}_2+2\text{NaOH}===\text{Na}_2\text{SO}_3+\text{H}_2\text{O}$ (实验室吸收 SO_2)

$\text{SO}_2+\text{H}_2\text{O}+2\text{NaOH}===2\text{NaHSO}_3$ (SO_2 过量)

*** $\text{SO}_3+\text{Ca}(\text{OH})_2===\text{CaSO}_4+\text{H}_2\text{O}$**

$\text{CO}_2+2\text{NaOH}(\text{过量})===\text{Na}_2\text{CO}_3+\text{H}_2\text{O}$

$\text{CO}_2(\text{过量})+\text{NaOH}===\text{NaHCO}_3$ (理解上述两个反应的原理，类比 SO_2)

$\text{CO}_2+\text{Ca}(\text{OH})_2(\text{过量})===\text{CaCO}_3\downarrow+\text{H}_2\text{O}$ (鉴别 CO_2)

$2\text{CO}_2(\text{过量})+\text{Ca}(\text{OH})_2===\text{Ca}(\text{HCO}_3)_2$ (类比上两个反应)

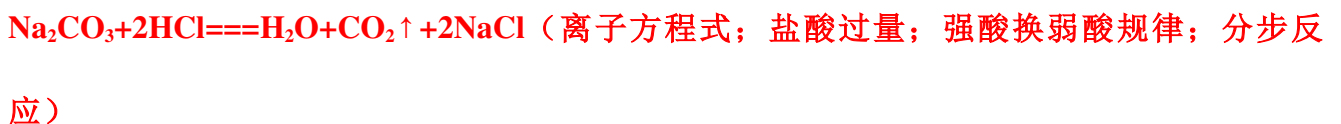
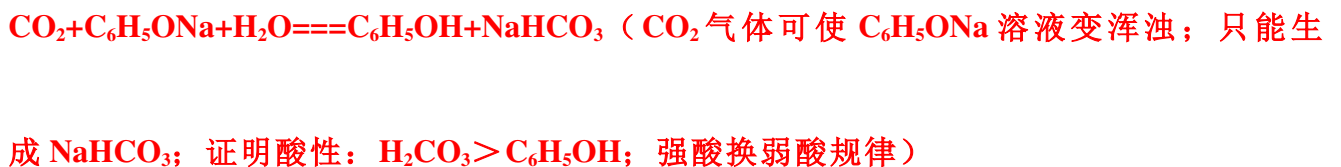
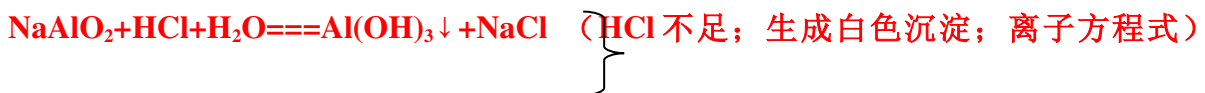
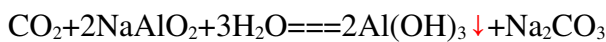
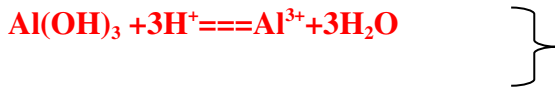
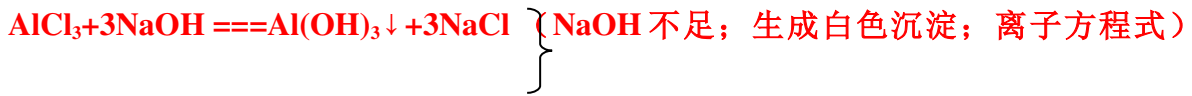
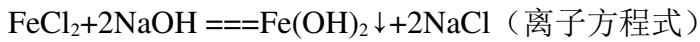
$\text{SiO}_2+2\text{NaOH}===\text{Na}_2\text{SiO}_3+\text{H}_2\text{O}$ (常温下强碱缓慢腐蚀玻璃；碱性物质试剂瓶的塞子不能用玻璃塞；铝土矿提纯；离子方程式；硅酸钠水溶液俗名水玻璃)

$\text{Al}_2\text{O}_3+6\text{H}^+===2\text{Al}^{3+}+3\text{H}_2\text{O}$ }

$\text{Al}_2\text{O}_3+2\text{OH}^+===2\text{AlO}_2^-+\text{H}_2\text{O}$ (Al_2O_3 是两性氧化物；离子方程式)

$\text{FeO}+2\text{H}^+===\text{Fe}^{2+}+2\text{H}_2\text{O}$ (原理；离子方程式)

$\text{Fe}_2\text{O}_3+6\text{H}^+===2\text{Fe}^{3+}+3\text{H}_2\text{O}$ (原理；离子方程式)



$3\text{NaHCO}_3 + \text{AlCl}_3 \rightleftharpoons \text{Al}(\text{OH})_3 \downarrow + 3\text{CO}_2 \uparrow + 3\text{NaCl}$ (泡沫灭火器工作原理; 双水解反应)

$4\text{HF} + \text{SiO}_2 \rightleftharpoons \text{SiF}_4 \uparrow + 2\text{H}_2\text{O}$ (SiO_2 的特性; 雕刻玻璃; HF 弱酸, 酸性小于 H_2CO_3)

$*\text{NH}_3 + \text{NaCl} + \text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{NaHCO}_3 + \text{NH}_4\text{Cl}$

(原理; 此反应用于工业制备小苏打, 苏打; 试剂通入的顺序)

$\text{SiO}_2 + \text{CaO} \xrightarrow{\text{高温}} \text{CaSiO}_3$

$\text{SO}_3 + \text{CaO} \rightleftharpoons \text{CaSO}_4$ (酸性氧化物与碱性氧化物反应)

五、不稳定性

$2\text{HClO} \xrightarrow{\text{光}} 2\text{HCl} + \text{O}_2 \uparrow$ (久置氯水的漂白性减弱)

$\text{NH}_3 \cdot \text{H}_2\text{O} \xrightarrow{\Delta} \text{NH}_3 \uparrow + \text{H}_2\text{O}$

$2\text{H}_2\text{O}_2 \xrightarrow{\Delta} 2\text{H}_2\text{O} + \text{O}_2 \uparrow$ (H_2O_2 的电子式; 不稳定性; 电子转移; 用途)

$\text{H}_2\text{SiO}_3 \xrightarrow{\Delta} \text{SiO}_2 + \text{H}_2\text{O}$ (难溶酸加热生成同价态的非金属氧化物和 H_2O)

$\text{Mg}(\text{OH})_2 \xrightarrow{\Delta} \text{MgO} + \text{H}_2\text{O}$

$2\text{Al}(\text{OH})_3 \xrightarrow{\Delta} \text{Al}_2\text{O}_3 + 3\text{H}_2\text{O}$

$2\text{Fe}(\text{OH})_3 \xrightarrow{\Delta} \text{Fe}_2\text{O}_3 + 3\text{H}_2\text{O}$

$\text{Cu}(\text{OH})_2 \xrightarrow{\Delta} \text{CuO} + \text{H}_2\text{O}$ (以上反应: 难溶性碱加热生成同价态的金属氧化物和 H_2O)

$\text{NH}_4\text{Cl} \xrightarrow{\Delta} \text{NH}_3 + \text{HCl}$ (不能用来制备 NH_3 ; 铵盐都不稳定)

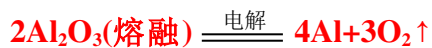
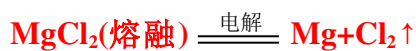
$\text{NH}_4\text{HCO}_3 \xrightarrow{\Delta} \text{NH}_3 \uparrow + \text{H}_2\text{O} \uparrow + \text{CO}_2 \uparrow$ (碳铵不稳定)

$2\text{KMnO}_4 \xrightarrow{\Delta} \text{K}_2\text{MnO}_4 + \text{MnO}_2 + \text{O}_2 \uparrow$ (实验室制备 O_2)

$2\text{KClO}_3 \xrightarrow{\Delta} 2\text{KCl} + 3\text{O}_2 \uparrow$ (实验室制备 O_2)



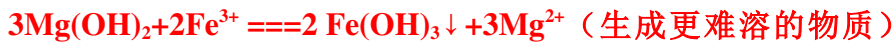
六、电解



电解溶液需具体问题具体分析

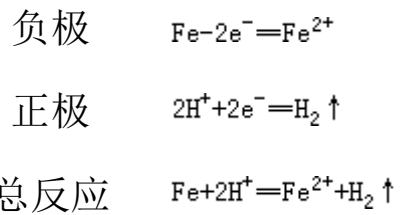
七、水解反应





八、原电池

钢铁的析氢腐蚀



钢铁的吸氧腐蚀

