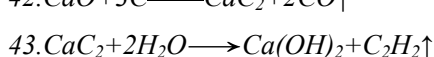
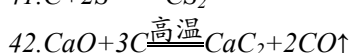
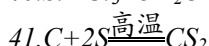
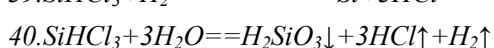
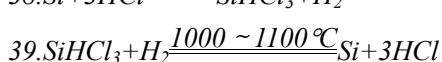
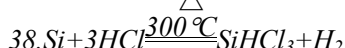
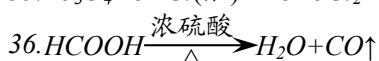
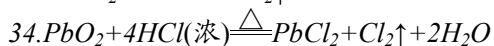
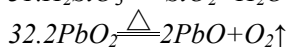
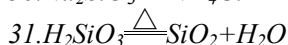
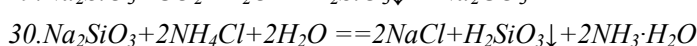
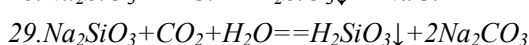
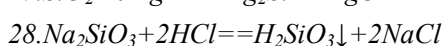
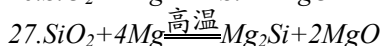
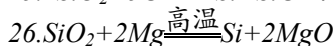
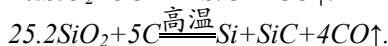
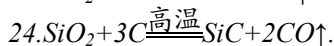
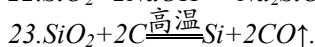
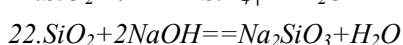
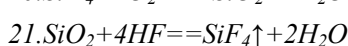
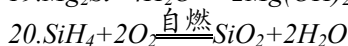
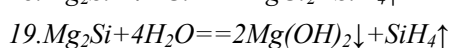
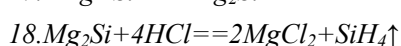
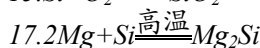
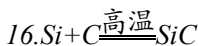
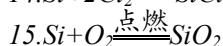
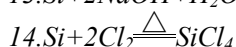
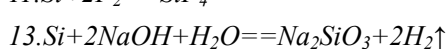
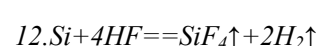
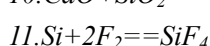
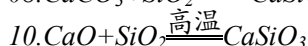
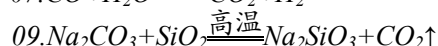
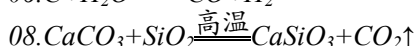
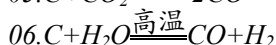
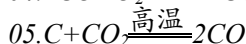
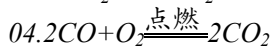
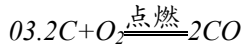
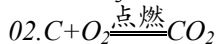
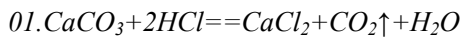


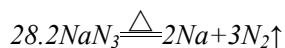
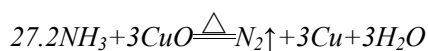
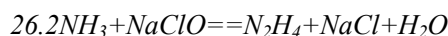
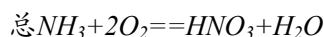
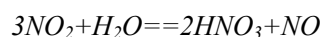
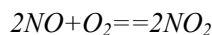
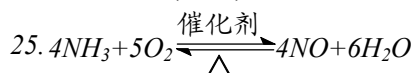
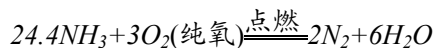
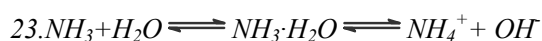
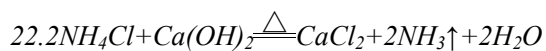
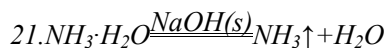
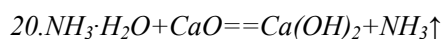
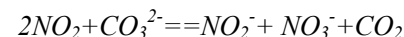
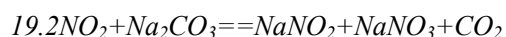
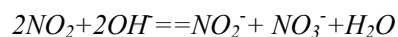
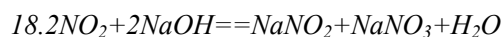
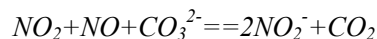
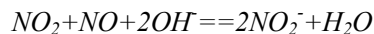
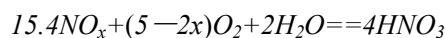
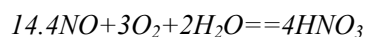
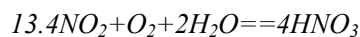
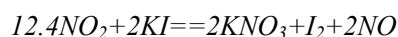
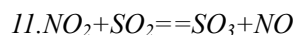
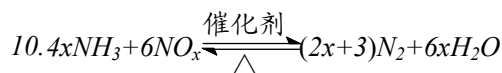
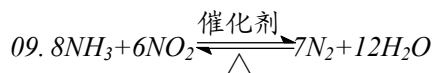
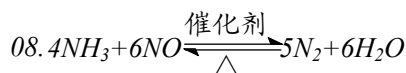
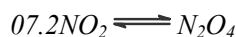
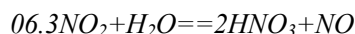
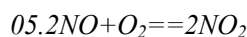
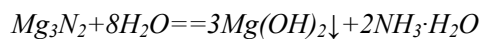
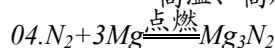
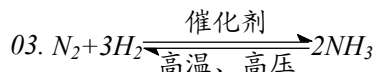
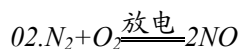
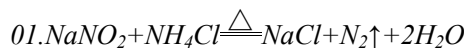
高中化学化学方程式荟萃

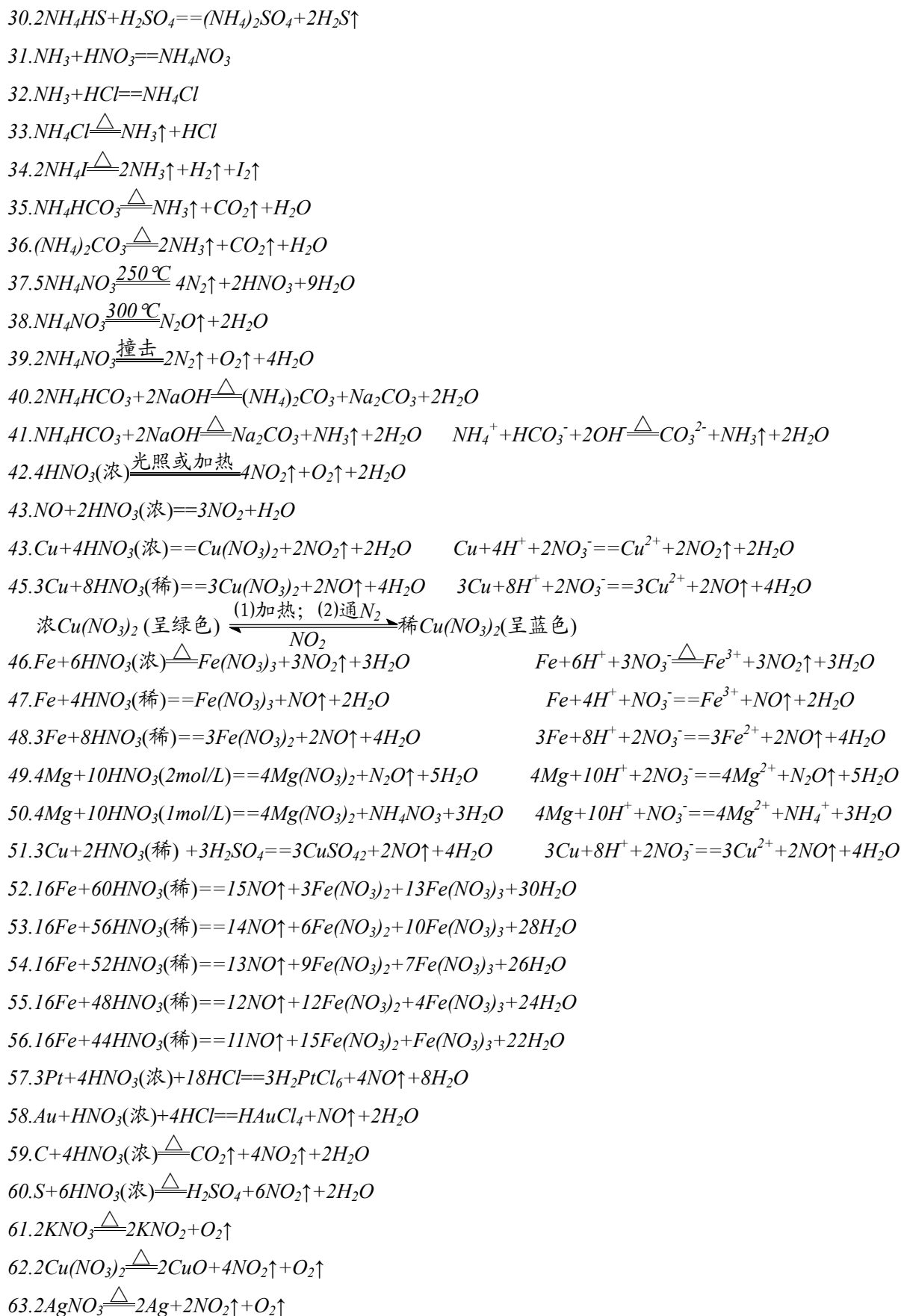
1、碳硅及其化合物化学方程式



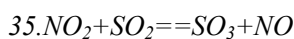
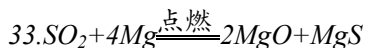
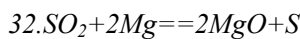
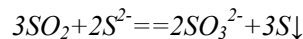
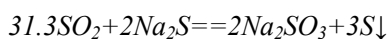
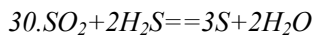
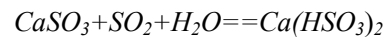
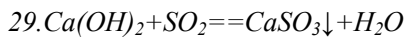
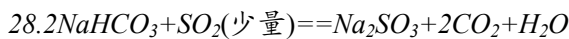
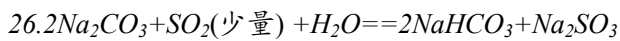
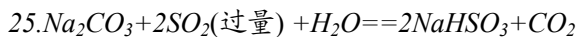
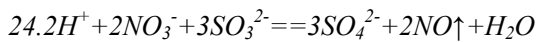
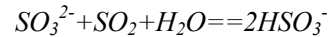
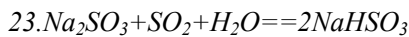
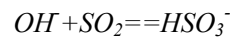
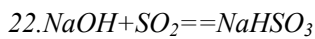
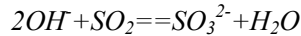
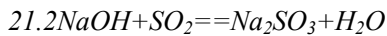
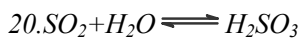
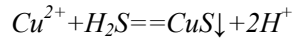
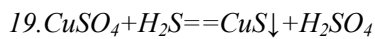
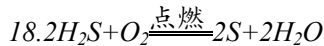
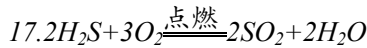
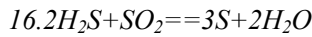
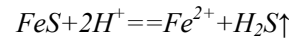
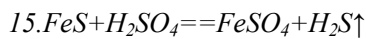
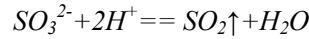
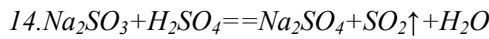
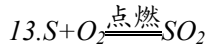
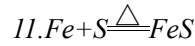
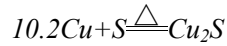
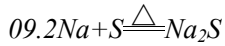
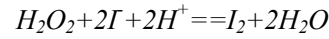
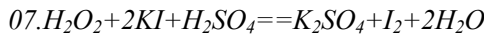
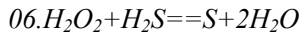
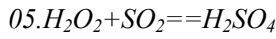
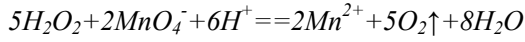
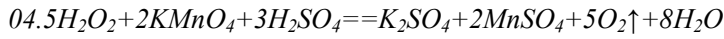
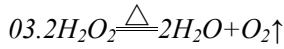
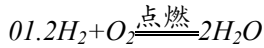
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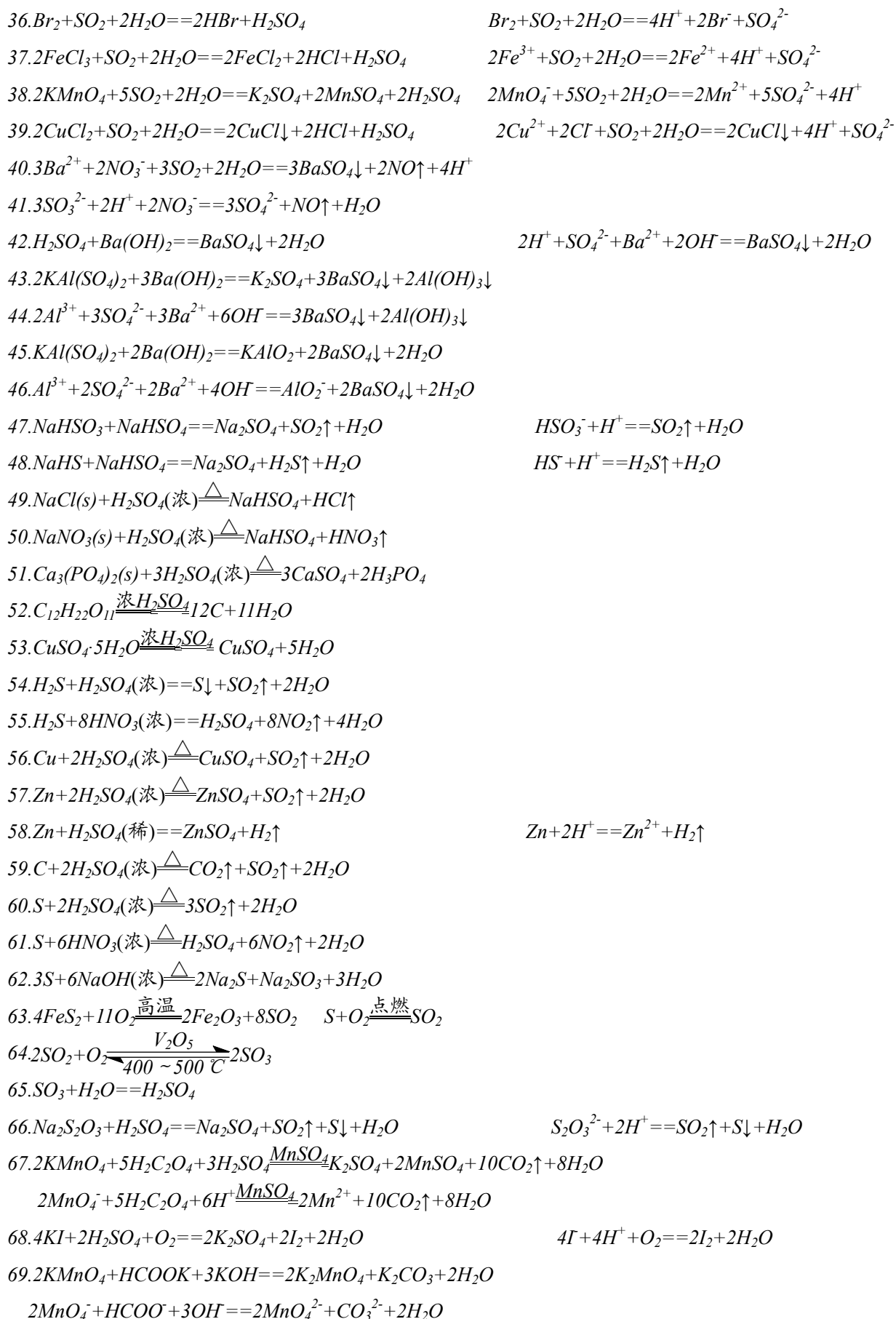
2、氮及其化合物化学方程式



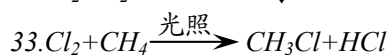
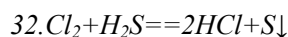
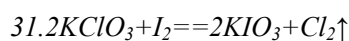
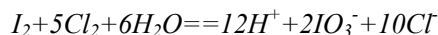
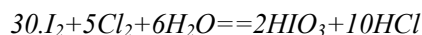
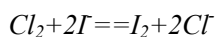
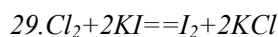
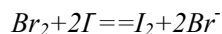
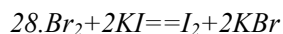
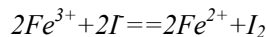
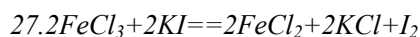
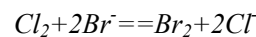
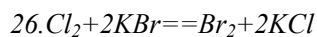
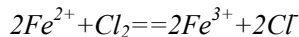
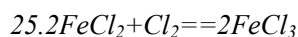
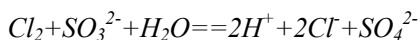
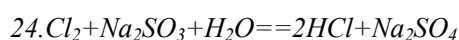
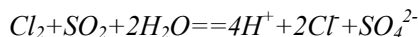
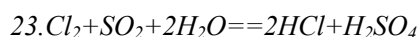
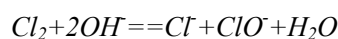
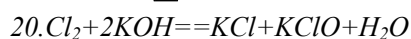
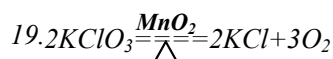
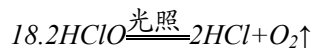
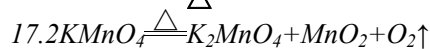
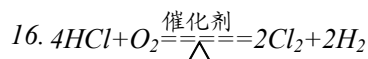
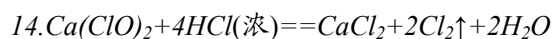
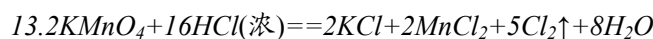
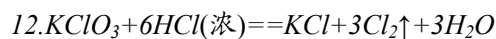
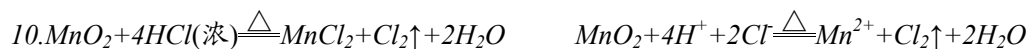
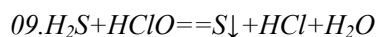
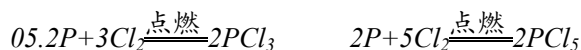
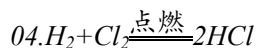
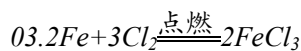
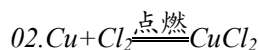
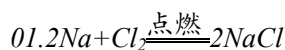


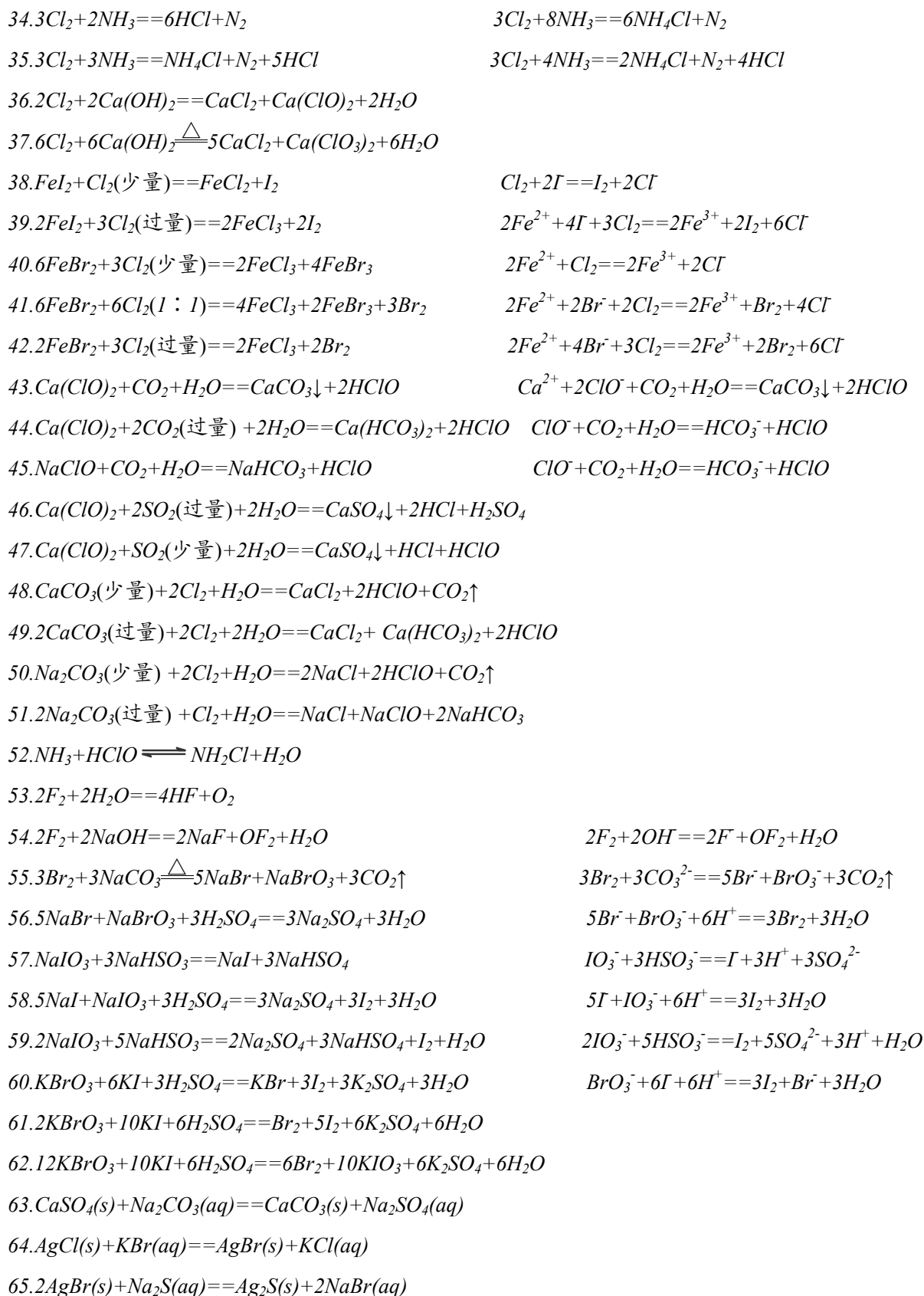
3. 氧硫及其化合物化学方程式





4、氯及其化合物化学方程式

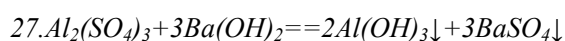
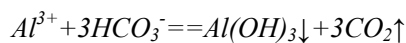
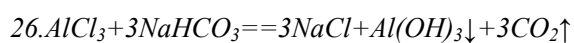
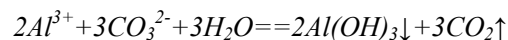
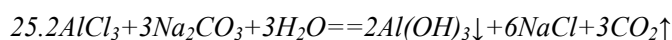
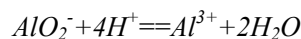
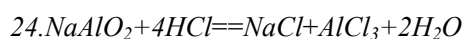
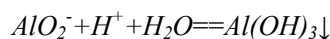
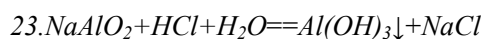
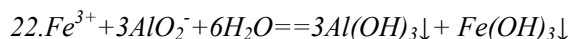
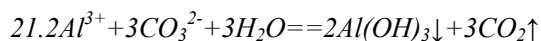
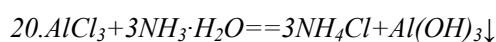
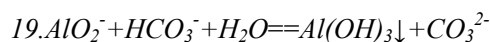
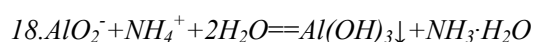
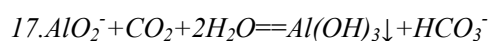
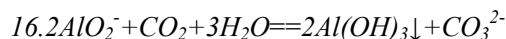
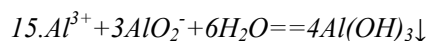
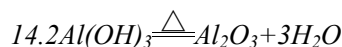
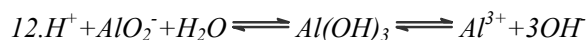
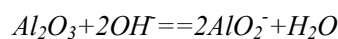
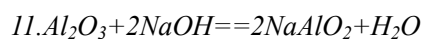
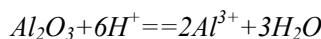
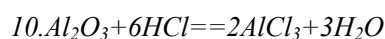
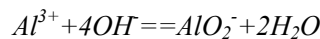
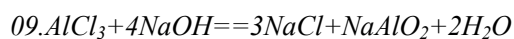
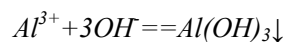
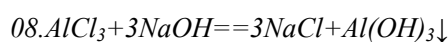
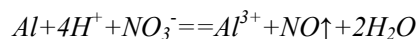
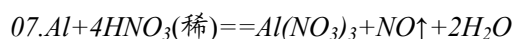
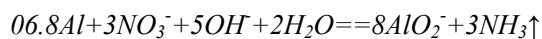
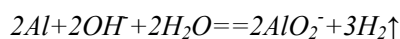
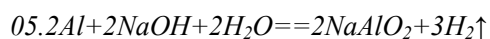
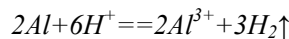
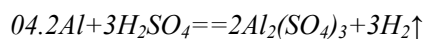
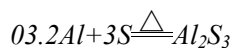
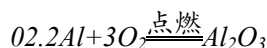
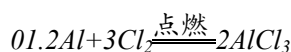


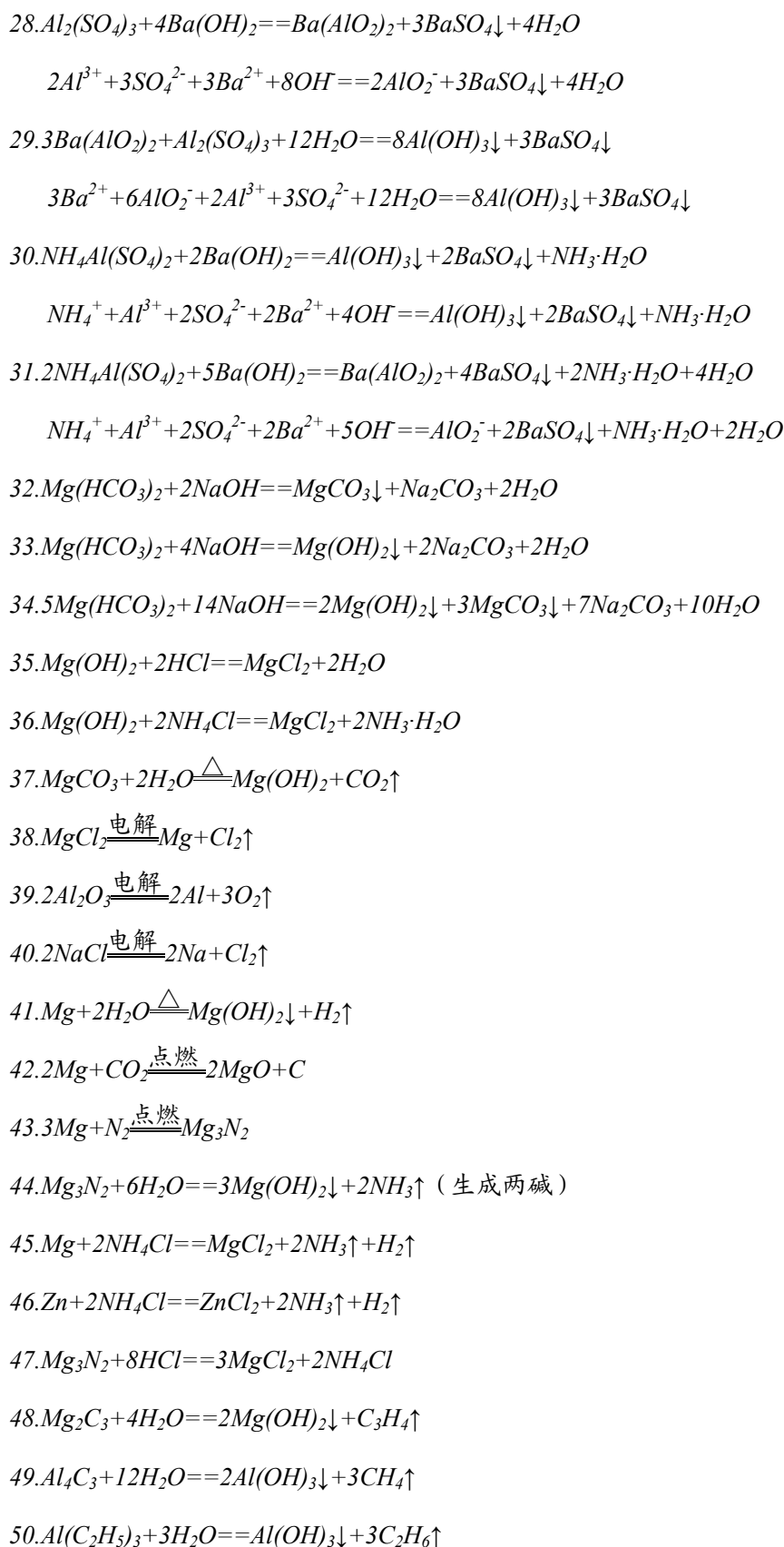


5、钠及其化合物化学方程式

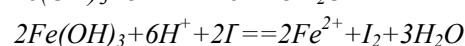
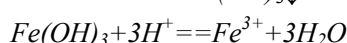
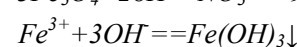
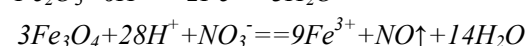
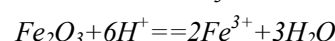
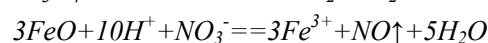
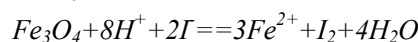
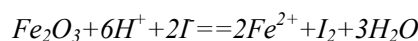
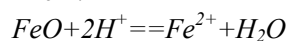
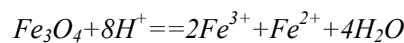
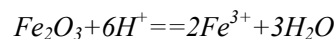
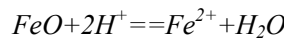
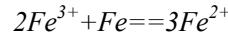
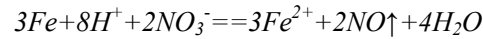
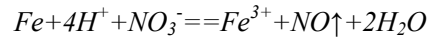
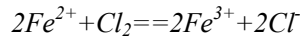
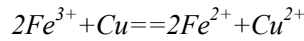
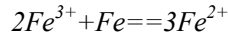
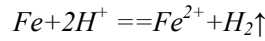
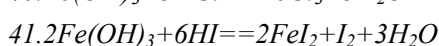
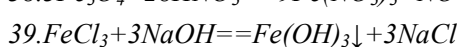
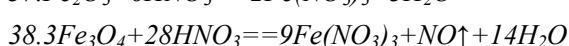
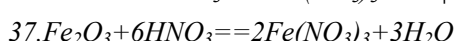
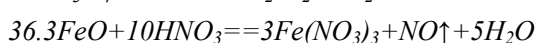
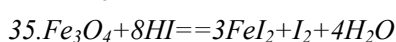
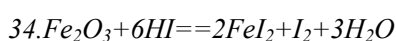
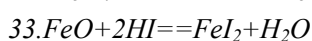
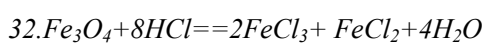
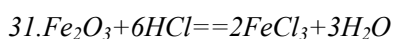
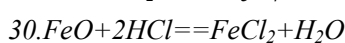
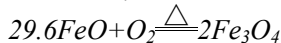
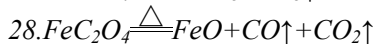
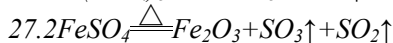
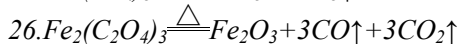
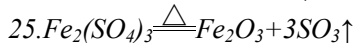
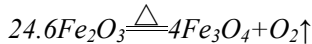
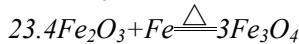
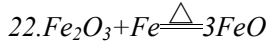
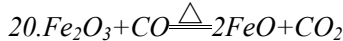
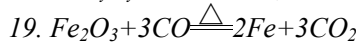
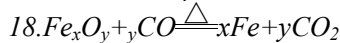
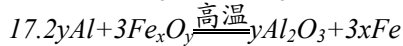
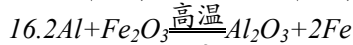
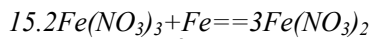
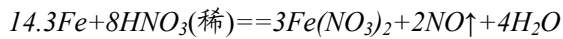
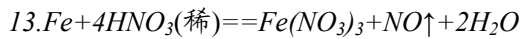
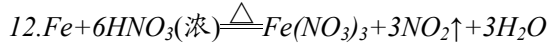
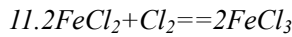
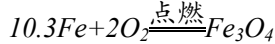
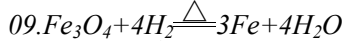
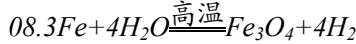
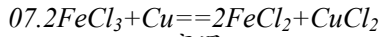
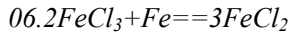
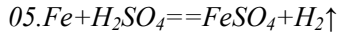
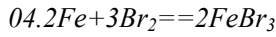
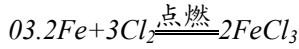
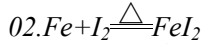
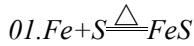
01. $4Na + O_2 = 2Na_2O$
02. $2Na + O_2 \xrightarrow{\text{点燃}} Na_2O_2$
03. $2Na_2O + O_2 \xrightarrow{\Delta} 2Na_2O_2$
04. $4Na + 3CO_2 \xrightarrow{\text{点燃}} 2Na_2CO_3 + C$
05. $6Na + Fe_2O_3 \xrightarrow{\Delta} 3Na_2O + 2Fe$
06. $2Na + 2H_2O = 2NaOH + H_2\uparrow$ $2Na + 2H_2O = 2Na^+ + 2OH^- + H_2\uparrow$
07. $2Na + 2CH_2CH_2OH \longrightarrow 2CH_2CH_2ONa + H_2\uparrow$
08. $2Na_2O_2 + 2H_2O = 4NaOH + O_2\uparrow$ $2Na_2O_2 + 2H_2O = 4Na^+ + 4OH^- + O_2\uparrow$
09. $2Na_2O_2 + 2CO_2 = 2Na_2CO_3 + O_2$
10. $2Na_2O_2 + 2SO_3 = 2Na_2SO_4 + O_2$
11. $Na_2O_2 + SO_2 = Na_2SO_4$
12. $Na_2O_2 + 2NO_2 = 2NaNO_3$
13. $3Na_2O_2 + 2Al = 2NaAlO_2 + 2Na_2O$
14. $Na_2O_2 + Cu = Na_2O + CuO$
15. $4Na_2O_2 + 4FeCl_2 + 6H_2O = 8NaCl + 4Fe(OH)_3\downarrow + O_2\uparrow$ $4Na_2O_2 + 4Fe^{2+} + 6H_2O = 8Na^+ + 4Fe(OH)_3\downarrow + O_2\uparrow$
16. $3Na_2O_2 + 6FeCl_2 + 6H_2O = 6NaCl + 4Fe(OH)_3\downarrow + 2FeCl_3$ $3Na_2O_2 + 6Fe^{2+} + 6H_2O = 6Na^+ + 4Fe(OH)_3\downarrow + 2Fe^{3+}$
17. $2NaHCO_3 \xrightarrow{\Delta} Na_2CO_3 + CO_2\uparrow + H_2O$
18. $NaHCO_3 + NaOH = Na_2CO_3 + H_2O$
19. $2Na_2O_2 + 2NaHCO_3 = 2Na_2CO_3 + 2NaOH + O_2\uparrow$
20. $2Na_2O_2 + 4NaHCO_3 = 4Na_2CO_3 + 2H_2O + O_2\uparrow$
21. $2Na_2O_2 + 4HCl = 4NaCl + 2H_2O + O_2\uparrow$
22. $2Na + CuSO_4 + 2H_2O = Na_2SO_4 + Cu(OH)_2\downarrow + H_2\uparrow$
23. $Na_2CO_3 + BaCl_2 = 2NaCl + BaCO_3\downarrow$
24. $Na_2CO_3 + Ca(OH)_2 = CaCO_3\downarrow + 2NaOH$
25. $Na_2CO_3 + 2HCl = 2NaCl + CO_2\uparrow + H_2O$
26. $Na_2CO_3 + HCl = NaHCO_3 + NaCl$
27. $NaHCO_3 + HCl = NaCl + CO_2\uparrow + H_2O$
28. $2AlCl_3 + 3Na_2CO_3 + 3H_2O = 2Al(OH)_3\downarrow + 6NaCl + 3CO_2\uparrow$ $2Al^{3+} + 3CO_3^{2-} + 3H_2O = 2Al(OH)_3\downarrow + 3CO_2\uparrow$
29. $AlCl_3 + 3NaHCO_3 = 3NaCl + Al(OH)_3\downarrow + 3CO_2\uparrow$ $Al^{3+} + 3HCO_3^- = Al(OH)_3\downarrow + 3CO_2\uparrow$
30. $4Na + TiCl_4 = 4NaCl + Ti$
31. $2NaCl \xrightarrow{\text{电解}} 2Na + Cl_2\uparrow$
32. $2NaCl + 2H_2O \xrightarrow{\text{电解}} H_2\uparrow + 2NaOH + Cl_2\uparrow$ $2Cl^- + 2H_2O \xrightarrow{\text{电解}} H_2\uparrow + 2OH^- + Cl_2\uparrow$
33. $2KO_2 \xrightarrow{\Delta} K_2O_2 + O_2\uparrow$
34. $4KO_2 \xrightarrow{\Delta} 2K_2O + 3O_2\uparrow$
35. $K_2O + CO_2 \xrightarrow{\Delta} K_2CO_3$
36. $2K_2O_2 + 2CO_2 \xrightarrow{\Delta} 2K_2CO_3 + O_2\uparrow$
37. $4KO_2 + 2CO_2 \xrightarrow{\Delta} 2K_2CO_3 + 3O_2\uparrow$
38. $NaCl + NH_3 + H_2O + CO_2 = NaHCO_3\downarrow + NH_4Cl$
39. $2NaHCO_3 \xrightarrow{\Delta} Na_2CO_3 + CO_2\uparrow + H_2O$
40. $NaHCO_3 + NaCl + NH_3 \xrightarrow{5 \sim 10^\circ C} Na_2CO_3 + NH_4Cl\downarrow$

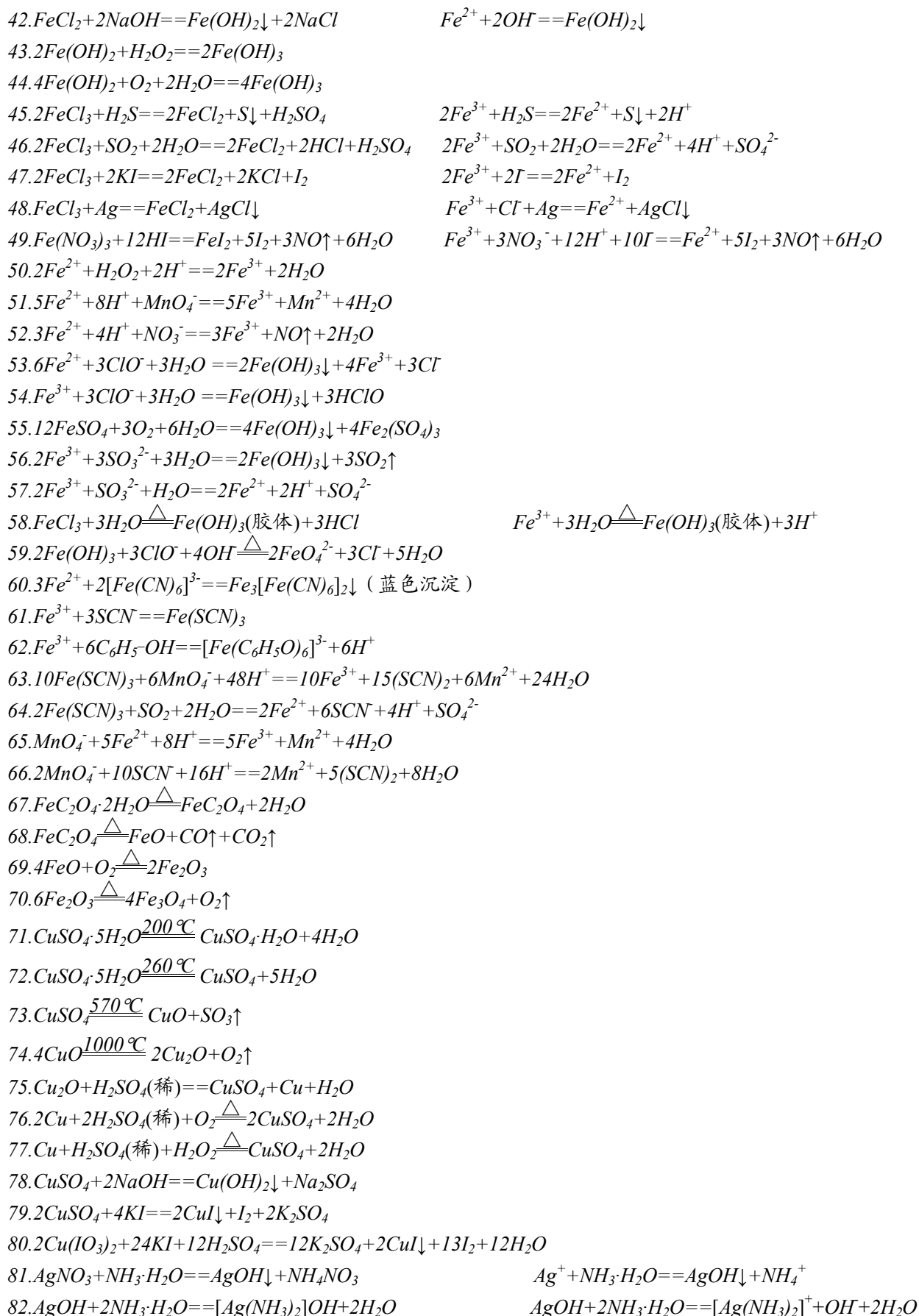
6、镁铝及其化合物化学方程式





7、铁及其化合物化学方程式





8、原电池反应方程式

01. 锌铜原电池——总反应方程式: $Zn + H_2SO_4 = ZnSO_4 + H_2\uparrow$

负极反应式: $Zn - 2e^- = Zn^{2+}$

正极反应式: $2H^+ + 2e^- = H_2\uparrow$

02. 锌锰干原电池——总反应方程式: $Zn + 2NH_4Cl + MnO_2 = ZnCl_2 + 2NH_3\uparrow + Mn_2O_3 + 2H_2O$

负极反应式: $Zn - 2e^- = Zn^{2+}$

正极反应式: $2NH_4^+ + 2e^- + 2MnO_2 = 2NH_3\uparrow + Mn_2O_3 + 2H_2O$

03. 碱性锌锰干电池——总反应方程式: $Zn + 2MnO_2 + 2H_2O = Zn(OH)_2 + 2MnO(OH)$

负极反应式: $Zn - 2e^- + 2OH^- = Zn(OH)_2$

正极反应式: $2MnO_2 + 2e^- + 2H_2O = 2MnO(OH) + 2OH^-$

04. 锌银电池——总反应方程式: $Zn + Ag_2O + H_2O = Zn(OH)_2 + 2Ag$

负极反应式: $Zn - 2e^- + 2OH^- = Zn(OH)_2$

正极反应式: $Ag_2O + 2e^- + H_2O = 2Ag + 2OH^-$

05. 锂电池——总反应方程式: $8Li + 3SOCl_2 = 6LiCl + Li_2SO_3 + 2S$

负极反应式: $8Li - 8e^- = 8Li^+$

正极反应式: $3SOCl_2 + 8e^- = SO_3^{2-} + 2S + 6Cl^-$

06. 铅蓄电池——总反应方程式: $Pb + PbO_2 + 2H_2SO_4 \xrightleftharpoons[\text{充电}]{\text{放电}} 2PbSO_4 + 2H_2O$

负极反应式: $Pb - 2e^- + SO_4^{2-} = PbSO_4$

正极反应式: $PbO_2 + 2e^- + 4H^+ + SO_4^{2-} = PbSO_4 + 2H_2O$

07. 镉镍电池——总反应方程式: $Cd + 2NiO(OH) + 2H_2O \xrightleftharpoons[\text{充电}]{\text{放电}} Cd(OH)_2 + 2Ni(OH)_2$

负极反应式: $Cd - 2e^- + 2OH^- = Cd(OH)_2$

正极反应式: $2NiO(OH) + 2e^- + 2H_2O = 2Ni(OH)_2 + 2OH^-$

08. 氢镍电池——总反应方程式: $H_2 + 2NiO(OH) \xrightleftharpoons[\text{充电}]{\text{放电}} 2Ni(OH)_2$

负极反应式: $H_2 - 2e^- + 2OH^- = 2H_2O$

正极反应式: $2NiO(OH) + 2e^- + 2H_2O = 2Ni(OH)_2 + 2OH^-$

09. 铁镍电池——总反应方程式: $Fe + NiO_2 + 2H_2O \xrightleftharpoons[\text{充电}]{\text{放电}} Fe(OH)_2 + Ni(OH)_2$

负极反应式: $Fe - 2e^- + 2OH^- = Fe(OH)_2$

正极反应式: $NiO_2 + 2e^- + 2H_2O = Ni(OH)_2 + 2OH^-$

10. 锂离子电池——总反应方程式: $Li + LiMn_2O_4 \xrightleftharpoons[\text{充电}]{\text{放电}} Li_2Mn_2O_4$

负极反应式: $Li - e^- = Li^+$

正极反应式: $LiMn_2O_4 + e^- + Li^+ = Li_2Mn_2O_4$

11. 锂离子电池——总反应方程式: $C_6Li + Li_{1-x}MO_2 \xrightleftharpoons[\text{充电}]{\text{放电}} C_6Li_{1-x} + LiMO_2$

负极反应式: $C_6Li - xe^- = xLi^+ + C_6Li_{1-x}$

正极反应式: $Li_{1-x}MO_2 + xe^- + xLi^+ = LiMO_2$

12. 氢氧燃料电池——总反应方程式: $2H_2 + O_2 = 2H_2O(l)$

$H_2SO_4(aq)$ 负极: $2H_2 - 4e^- = 4H^+$

正极: $O_2 + 4e^- + 4H^+ = 2H_2O$

$KOH(aq)$ 负极: $2H_2 - 4e^- + 4OH^- = 4H_2O$

正极: $O_2 + 4e^- + 2H_2O = 4OH^-$

熔融 Y_2O_3 负极: $2H_2 - 4e^- + 2O^{2-} = 4H_2O$

正极: $O_2 + 4e^- = 2O^{2-}$

熔融 K_2CO_3 负极: $2H_2 - 4e^- + 2CO_3^{2-} = 2CO_2 + 2H_2O$

正极: $O_2 + 4e^- + 2CO_2 = 2CO_3^{2-}$

13. 甲烷燃料电池——总反应方程式: $CH_4 + 2O_2 = CO_2 + 2H_2O(l)$ (或 $CH_4 + 2O_2 + 2OH^- = CO_3^{2-} + 3H_2O$)

$H_2SO_4(aq)$ 负极: $CH_4 - 8e^- + 2H_2O = CO_2 + 8H^+$

正极: $2O_2 + 8e^- + 8H^+ = 4H_2O$

$KOH(aq)$ 负极: $CH_4 - 8e^- + 10OH^- = CO_3^{2-} + 7H_2O$

正极: $2O_2 + 8e^- + 4H_2O = 8OH^-$

熔融 Y_2O_3 负极: $CH_4 - 8e^- + 4O^{2-} = CO_2 + 2H_2O$

正极: $2O_2 + 8e^- = 4O^{2-}$

熔融 K_2CO_3 负极: $CH_4 - 8e^- + 4CO_3^{2-} = 5CO_2 + 2H_2O$

正极: $2O_2 + 8e^- + 4CO_2 = 4CO_3^{2-}$

14. 一氧化碳燃料电池——总反应方程式: $2CO + 2O_2 = 2CO_2$

负极反应式: $2CO - 4e^- + 2CO_3^{2-} = 4CO_2$

正极反应式: $O_2 + 4e^- + 2CO_2 = 2CO_3^{2-}$

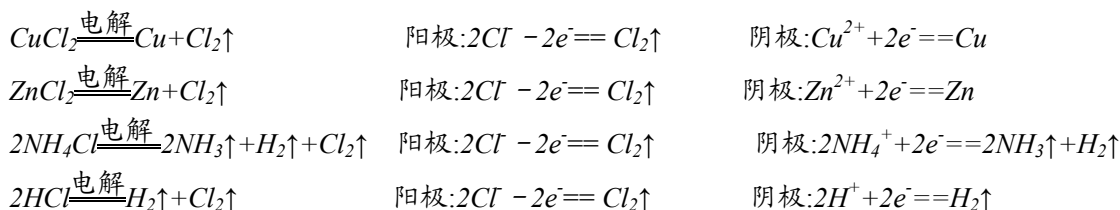
15. 甲醇燃料电池——总反应方程式: $2CH_3OH + 3O_2 + 4OH^- = 2CO_3^{2-} + 6H_2O$

负极反应式: $2CH_3OH - 12e^- + 16OH^- = 2CO_3^{2-} + 12H_2O$

正极反应式: $3O_2 + 12e^- + 6H_2O = 12OH^-$

9、电解反应方程式

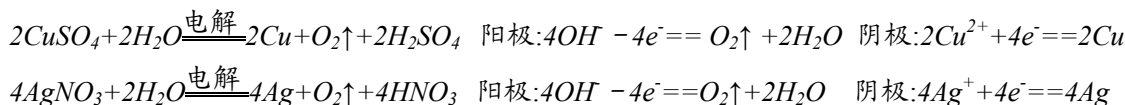
1. 分解电解质型:



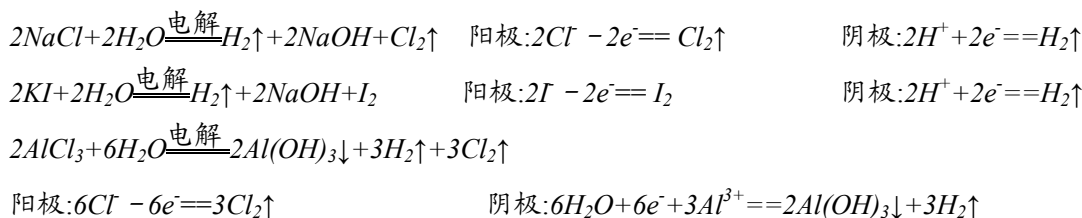
2. 电解水型: 电解 NaOH 、 KOH 、 H_2SO_4 、 HNO_3 、 NaHSO_4 、 K_2SO_4 、 KNO_3 、 Na_2CO_3 水溶液



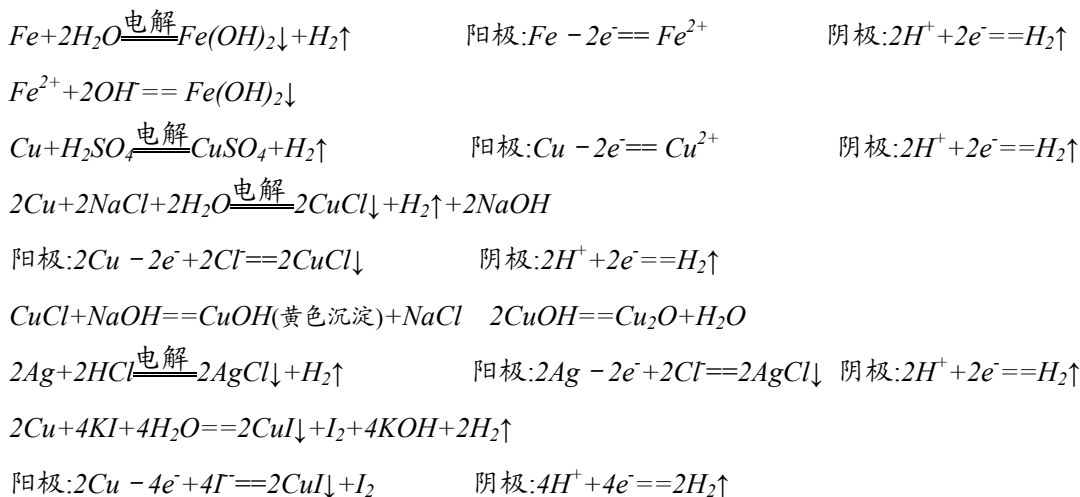
3. 放 O_2 生酸型:



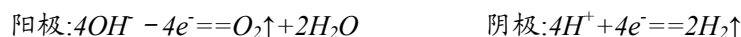
4. 放 H_2 生碱型:



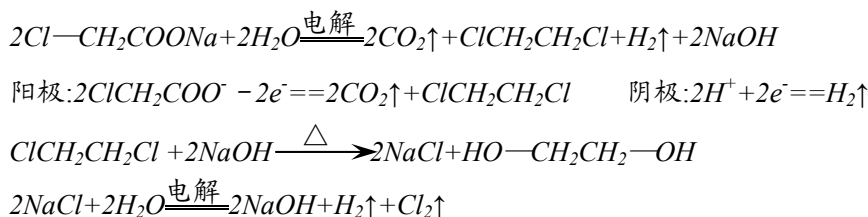
5. 活泼电极电解型:



6. 双膜电解型: $2\text{Na}_2\text{SO}_4 + 6\text{H}_2\text{O} \xrightarrow{\text{电解}} 2\text{H}_2 \uparrow + 4\text{NaOH} + \text{O}_2 \uparrow + 2\text{H}_2\text{SO}_4$

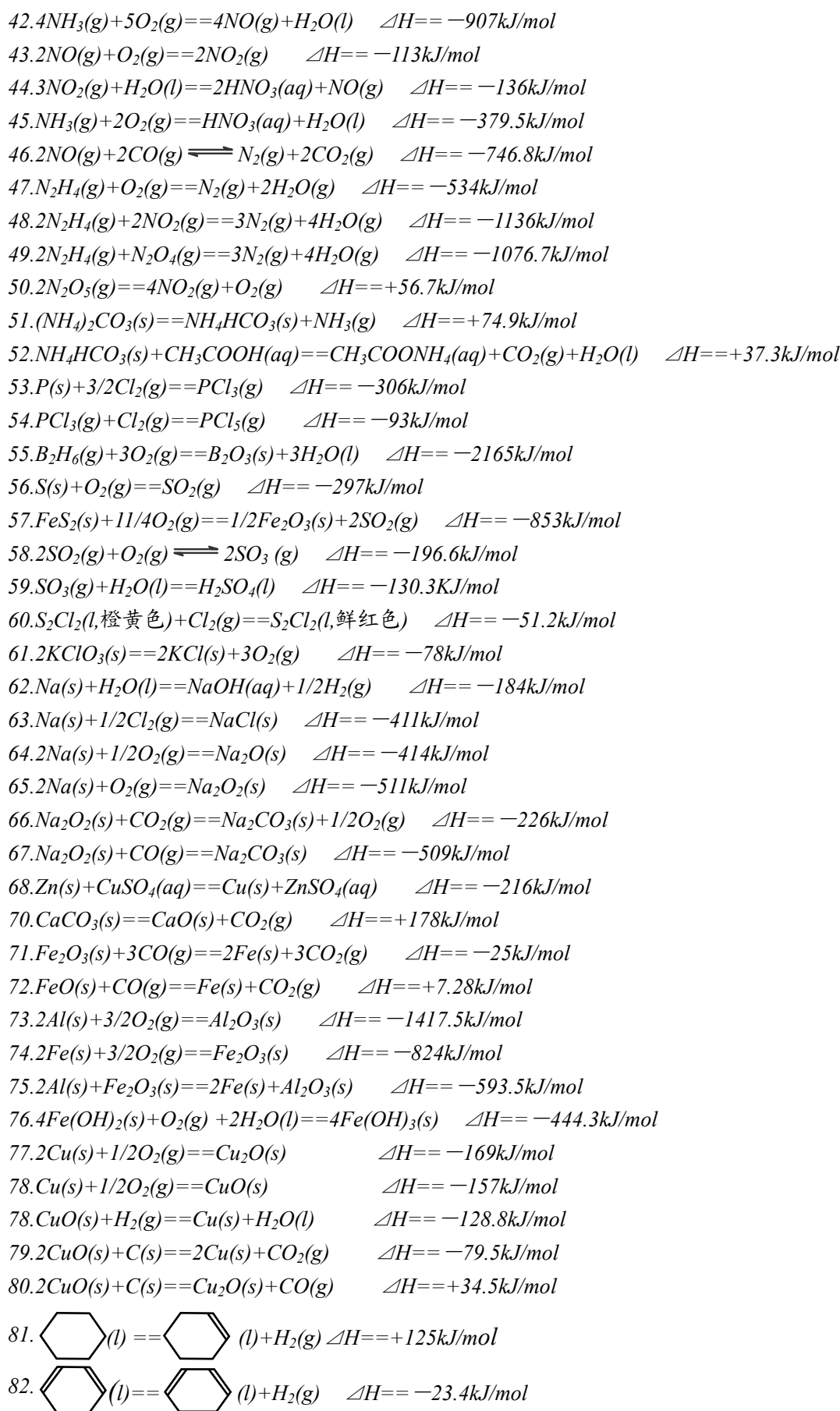


7. 连续电解型: (一氯代乙酸钠溶液)



10、热化学方程式

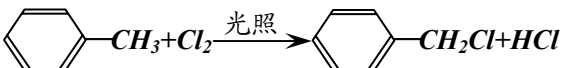
01. $\text{H}_2(\text{g}) + \text{F}_2(\text{g}) = 2\text{HF}(\text{g}) \quad \Delta H = -540 \text{ kJ/mol}$
02. $\text{H}_2(\text{g}) + \text{Cl}_2(\text{g}) = 2\text{HCl}(\text{g}) \quad \Delta H = -184.6 \text{ kJ/mol}$
03. $\text{H}_2(\text{g}) + \text{Br}_2(\text{g}) \rightleftharpoons 2\text{HBr}(\text{g}) \quad \Delta H = -102 \text{ kJ/mol}$
04. $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g}) \quad \Delta H = -14.9 \text{ kJ/mol}$
05. $\text{H}_2(\text{g}) + 1/2\text{O}_2(\text{g}) = \text{H}_2\text{O}(\text{g}) \quad \Delta H = -241.8 \text{ kJ/mol}$
06. $\text{H}_2(\text{g}) + 1/2\text{O}_2(\text{g}) = \text{H}_2\text{O}(\text{l}) \quad \Delta H = -285.8 \text{ kJ/mol}$
07. $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) = 2\text{H}_2\text{O}(\text{l}) \quad \Delta H = -571.6 \text{ kJ/mol}$
08. $\star \text{H}_2\text{O}(\text{g}) = \text{H}_2\text{O}(\text{l}) \quad \Delta H = -44 \text{ kJ/mol}$
09. $\text{NaOH}(\text{aq}) + 1/2\text{H}_2\text{SO}_4(\text{aq}) = 1/2\text{Na}_2\text{SO}_4(\text{aq}) + \text{H}_2\text{O}(\text{l}) \quad \Delta H = -57.3 \text{ kJ/mol}$
10. $\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) = \text{H}_2\text{O}(\text{l}) \quad \Delta H = -57.3 \text{ kJ/mol}$
11. $\text{NaOH}(\text{aq}) + \text{HCN}(\text{aq}) = \text{NaCN}(\text{aq}) + \text{H}_2\text{O}(\text{l}) \quad \Delta H = -12.1 \text{ kJ/mol}$
12. $\text{Ba}^{2+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) = \text{BaSO}_4(\text{s}) \quad \Delta H = -18 \text{ kJ/mol}$
13. $\text{Ba}(\text{OH})_2 \cdot 8\text{H}_2\text{O}(\text{s}) + 2\text{NH}_4\text{Cl}(\text{s}) = \text{BaCl}_2(\text{s}) + 2\text{NH}_3(\text{g}) + 10\text{H}_2\text{O}(\text{l}) \quad \Delta H > 0$
14. $\text{C}(\text{s}) + \text{O}_2(\text{g}) = \text{CO}_2(\text{g}) \quad \Delta H = -393.5 \text{ kJ/mol}$
15. $\text{C}(\text{s}) + 1/2\text{O}_2(\text{g}) = \text{CO}(\text{g}) \quad \Delta H = -110.5 \text{ kJ/mol}$
16. $\text{CO}(\text{g}) + 1/2\text{O}_2(\text{g}) = \text{CO}_2(\text{g}) \quad \Delta H = -283 \text{ kJ/mol}$
17. $\text{C}(\text{s}) + \text{CO}_2(\text{g}) = 2\text{CO}(\text{g}) \quad \Delta H = +172.5 \text{ kJ/mol}$
18. $\text{C}(\text{s}) + \text{H}_2\text{O}(\text{g}) = \text{CO}(\text{g}) + \text{H}_2(\text{g}) \quad \Delta H = +131.3 \text{ kJ/mol}$
19. $\text{CO}(\text{g}) + \text{H}_2\text{O}(\text{g}) = \text{CO}_2(\text{g}) + \text{H}_2(\text{g}) \quad \Delta H = -41.2 \text{ kJ/mol}$
20. $\text{CO}(\text{g}) + 2\text{H}_2(\text{g}) = \text{CH}_3\text{OH}(\text{g}) \quad \Delta H = -90.8 \text{ kJ/mol}$
21. $\text{CH}_4(\text{g}) + 2\text{O}_2(\text{g}) = \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l}) \quad \Delta H = -890.3 \text{ kJ/mol}$
22. $\text{C}_3\text{H}_8(\text{g}) + 5\text{O}_2(\text{g}) = 3\text{CO}_2(\text{g}) + 4\text{H}_2\text{O}(\text{l}) \quad \Delta H = -2220 \text{ kJ/mol}$
23. $\text{C}_8\text{H}_{18}(\text{l}) + 25/2\text{O}_2(\text{g}) = 8\text{CO}_2(\text{g}) + 9\text{H}_2\text{O}(\text{l}) \quad \Delta H = -5518 \text{ kJ/mol}$
24. $\text{C}_2\text{H}_4(\text{g}) + 3\text{O}_2(\text{g}) = 2\text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l}) \quad \Delta H = -1411 \text{ kJ/mol}$
25. $\text{C}_2\text{H}_2(\text{g}) + 5/2\text{O}_2(\text{g}) = 2\text{CO}_2(\text{g}) + \text{H}_2\text{O}(\text{l}) \quad \Delta H = -1300 \text{ kJ/mol}$
26. $\text{C}_2\text{H}_4(\text{g}) + \text{H}_2\text{O}(\text{l}) = \text{CH}_3\text{CH}_2\text{OH}(\text{l}) \quad \Delta H = -44.2 \text{ kJ/mol}$
27. $\text{CH}_3\text{OH}(\text{l}) + 3/2\text{O}_2(\text{g}) = \text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l}) \quad \Delta H = -726.5 \text{ kJ/mol}$
28. $\text{CH}_3\text{CH}_2\text{OH}(\text{l}) + 3\text{O}_2(\text{g}) = 2\text{CO}_2(\text{g}) + 3\text{H}_2\text{O}(\text{l}) \quad \Delta H = -1366.8 \text{ kJ/mol}$
29. $\text{CH}_3\text{COOH}(\text{l}) + 2\text{O}_2(\text{g}) = 2\text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l}) \quad \Delta H = -870.3 \text{ kJ/mol}$
30. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3(\text{g}) + 13/2\text{O}_2(\text{g}) = 4\text{CO}_2(\text{g}) + 5\text{H}_2\text{O}(\text{l}) \quad \Delta H = -2878 \text{ kJ/mol}$
31. $(\text{CH}_3)_2\text{CHCH}_3(\text{g}) + 13/2\text{O}_2(\text{g}) = 4\text{CO}_2(\text{g}) + 5\text{H}_2\text{O}(\text{l}) \quad \Delta H = -2869.6 \text{ kJ/mol}$
32. $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3(\text{g}) = (\text{CH}_3)_2\text{CHCH}_3(\text{g}) \quad \Delta H = -8.4 \text{ kJ/mol}$
33. $2\text{O}_3(\text{g}) = 3\text{O}_2(\text{g}) \quad \Delta H = -28.4 \text{ kJ/mol}$
34. $\text{C}(\text{s}, \text{金刚石}) = \text{C}(\text{s}, \text{石墨}) \quad \Delta H = -1.9 \text{ kJ/mol}$
35. $\text{P}_4(\text{s}, \text{白磷}) = 4\text{P}(\text{s}, \text{红磷}) \quad \Delta H = -29.2 \text{ kJ/mol}$
36. $\text{S}(\text{s}, \text{单斜硫}) = \text{S}(\text{s}, \text{正交硫}) \quad \Delta H = -1.16 \text{ kJ/mol}$
37. $\text{Sn}(\text{s}, \text{白锡}) = \text{Sn}(\text{s}, \text{灰锡}) \quad \Delta H = -2.1 \text{ kJ/mol}$
38. $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g}) \quad \Delta H = -92.4 \text{ kJ/mol}$
39. $2\text{NO}_2(\text{g}) \rightleftharpoons \text{N}_2\text{O}_4(\text{g}) \quad \Delta H = -56.9 \text{ kJ/mol}$
40. $\text{N}_2(\text{g}) + \text{O}_2(\text{g}) = 2\text{NO}(\text{g}) \quad \Delta H = +180 \text{ kJ/mol}$
41. $\text{N}_2(\text{g}) + 2\text{O}_2(\text{g}) = 2\text{NO}_2(\text{g}) \quad \Delta H = +67.7 \text{ kJ/mol}$

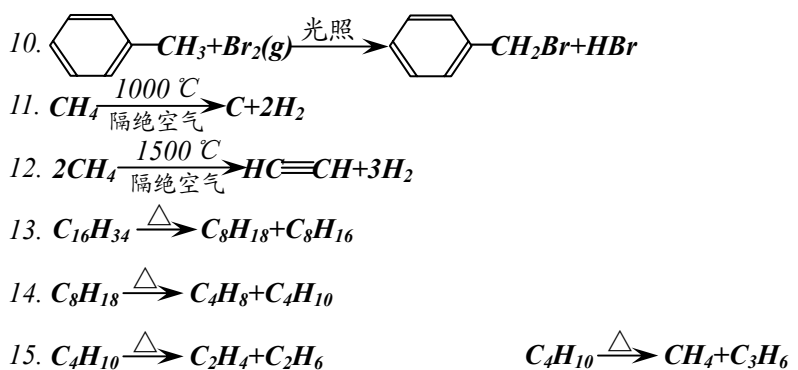


11、沉淀的生成和溶解章节化学方程式

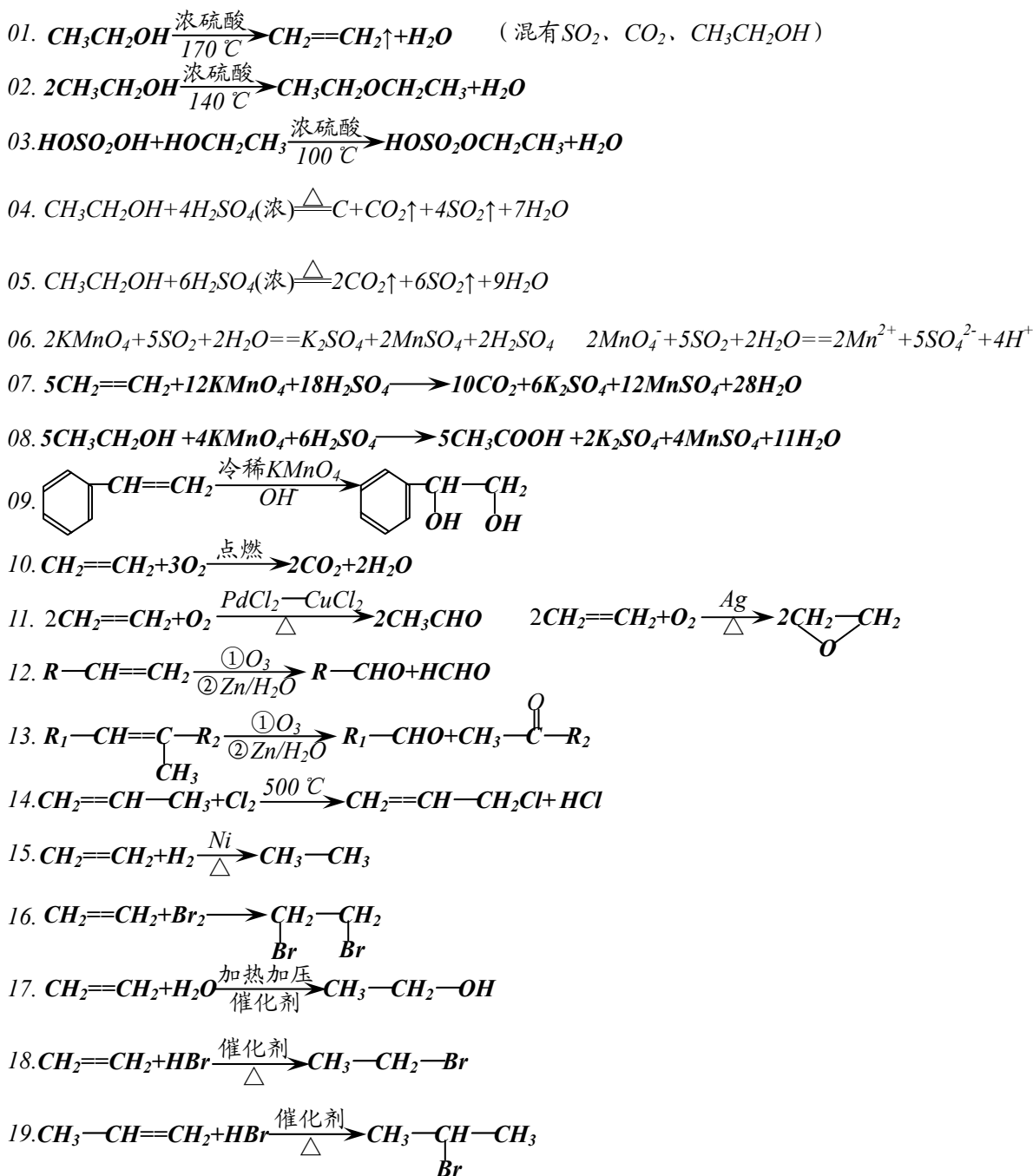
01. $\text{NaCl} + \text{AgNO}_3 = \text{AgCl} + \text{NaNO}_3$ (以 K_2CrO_4 作指示剂)
02. $\text{AgCl}(s) + \text{KBr}(aq) = \text{AgBr}(s) + \text{KCl}(aq)$
03. $\text{AgBr}(s) + \text{NaI}(aq) = \text{AgI}(s) + \text{NaBr}(aq)$
04. $2\text{AgI}(s) + \text{Na}_2\text{S}(aq) = \text{Ag}_2\text{S}(s) + 2\text{NaI}(aq)$
05. $\text{BaCO}_3(s) + \text{Na}_2\text{SO}_4(aq) = \text{BaSO}_4(s) + \text{Na}_2\text{CO}_3(aq)$
06. $\text{BaSO}_4(s) + \text{Na}_2\text{CO}_3(\text{饱和}) = \text{BaCO}_3(s) + \text{Na}_2\text{SO}_4(aq)$
07. $\text{Mg}(\text{OH})_2(s) + 2\text{NaF}(\text{饱和}) = \text{MgF}_2(s) + 2\text{NaOH}(aq)$
08. $\text{CaCl}_2(\text{FeCl}_3): 2\text{FeCl}_3 + 3\text{CaCO}_3 + 3\text{H}_2\text{O} = 2\text{Fe}(\text{OH})_3 + 3\text{CaCl}_2 + 3\text{CO}_2\uparrow$
09. $\text{NH}_4\text{Cl}(\text{FeCl}_3): \text{FeCl}_3 + 3\text{NH}_3 \cdot \text{H}_2\text{O} = \text{Fe}(\text{OH})_3(s)\downarrow + 3\text{NH}_4\text{Cl}$
10. $\text{CuCl}_2(\text{FeCl}_3): 2\text{FeCl}_3 + 3\text{CuCO}_3 + 3\text{H}_2\text{O} = 2\text{Fe}(\text{OH})_3 + 3\text{CuCl}_2 + 3\text{CO}_2\uparrow$
11. $\text{FeCl}_2(\text{CuCl}_2): \text{CuCl}_2(aq) + \text{FeS}(s) = \text{CuS}(s) + \text{FeCl}_2(aq)$
12. $\text{FeCl}_2(\text{CuCl}_2): \text{CuCl}_2(aq) + \text{H}_2\text{S}(g) = \text{CuS}(s) + 2\text{HCl}(aq)$
13. $\text{MnCl}_2(\text{CuCl}_2): \text{CuCl}_2(aq) + \text{MnS}(s) = \text{CuS}(s) + \text{MnCl}_2(aq)$
14. $\text{Fe}(\text{OH})_3$ 【 $\text{Al}(\text{OH})_3$ 】: $\text{Al}(\text{OH})_3 + \text{NaOH} = \text{NaAlO}_2 + 2\text{H}_2\text{O}$
15. $\text{Al}(\text{OH})_3$ 【 $\text{Mg}(\text{OH})_2$ 】: $\text{Mg}(\text{OH})_2 + 2\text{NH}_4\text{Cl} = \text{MgCl}_2 + 2\text{NH}_3 \cdot \text{H}_2\text{O}$
16. $3\text{CuS} + 8\text{HNO}_3(\text{稀}) = 3\text{Cu}(\text{NO}_3)_2 + 2\text{NO}\uparrow + 3\text{S} + 4\text{H}_2\text{O}$
17. $\text{AgCl} + 2\text{NH}_3 \cdot \text{H}_2\text{O} = [\text{Ag}(\text{NH}_3)_2]\text{Cl} + 2\text{H}_2\text{O}$
18. $\text{AgBr} + 2\text{Na}_2\text{S}_2\text{O}_3 = \text{Na}_3[\text{Ag}(\text{S}_2\text{O}_3)_2] + \text{NaBr}$
19. $\text{AgI} + 2\text{KCN} = \text{K}[\text{Ag}(\text{CN})_2] + \text{KI}$

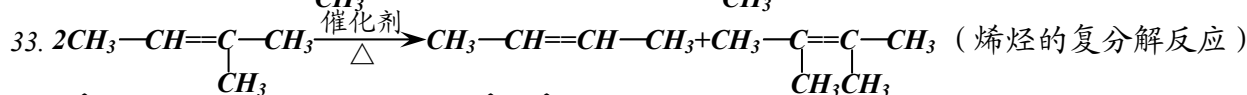
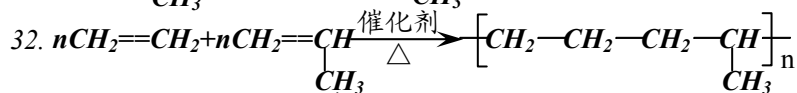
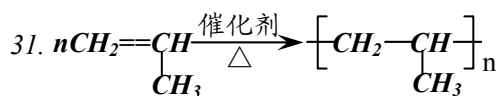
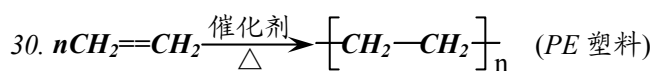
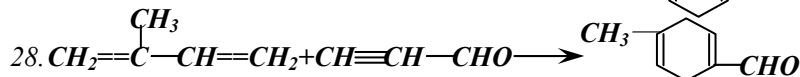
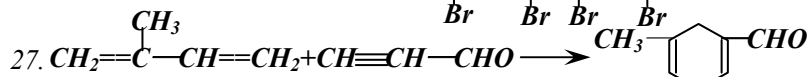
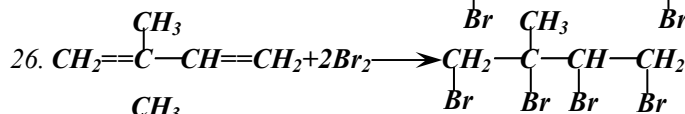
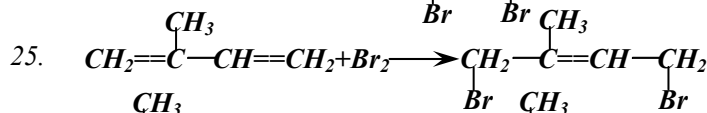
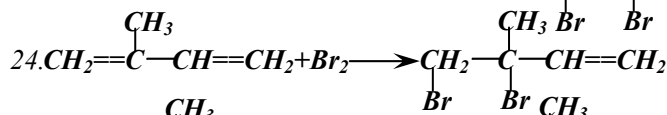
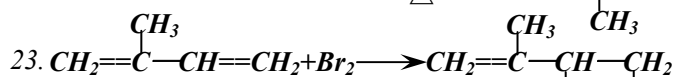
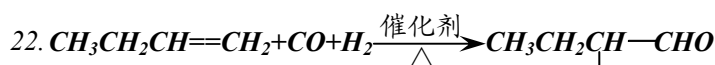
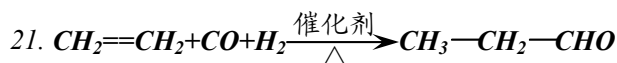
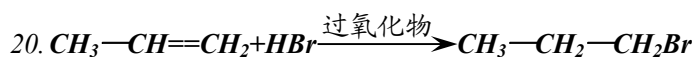
12、烷烃章节化学方程式

01. $\text{NH}_4\text{Cl} + \text{AgCNO} = \text{AgCl}\downarrow + \text{NH}_4\text{CNO}$
02. $\text{NH}_4\text{CNO} \xrightarrow{\Delta} \text{CO}(\text{NH}_2)_2$
03. $\text{CH}_3\text{COONa} + \text{NaOH}(s) \xrightarrow[\Delta]{\text{CaO}} \text{Na}_2\text{CO}_3 + \text{CH}_4\uparrow$
04. $\text{CH}_4 + 2\text{O}_2 \xrightarrow{\text{点燃}} \text{CO}_2 + 2\text{H}_2\text{O}$
05. $\text{CH}_4 + \text{Cl}_2 \xrightarrow{\text{光照}} \text{CH}_3\text{Cl}(g) + \text{HCl}$
06. $\text{CH}_3\text{Cl} + \text{Cl}_2 \xrightarrow{\text{光照}} \text{CH}_2\text{Cl}_2 + \text{HCl}$
07. $\text{CH}_2\text{Cl}_2 + \text{Cl}_2 \xrightarrow{\text{光照}} \text{CHCl}_3 + \text{HCl}$
08. $\text{CHCl}_3 + \text{Cl}_2 \xrightarrow{\text{光照}} \text{CCl}_4 + \text{HCl}$
09. 

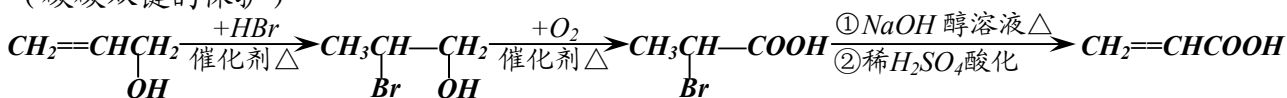


13、烯烃章节化学方程式

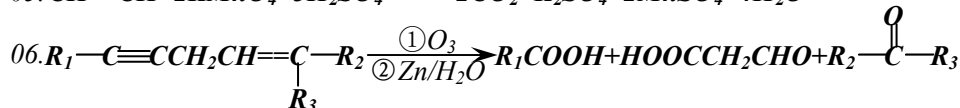
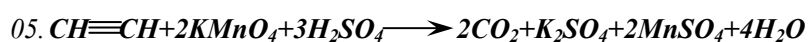
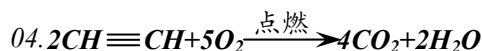
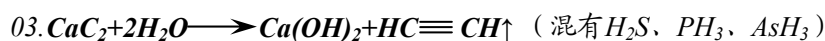
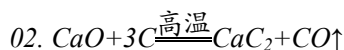
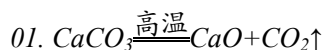


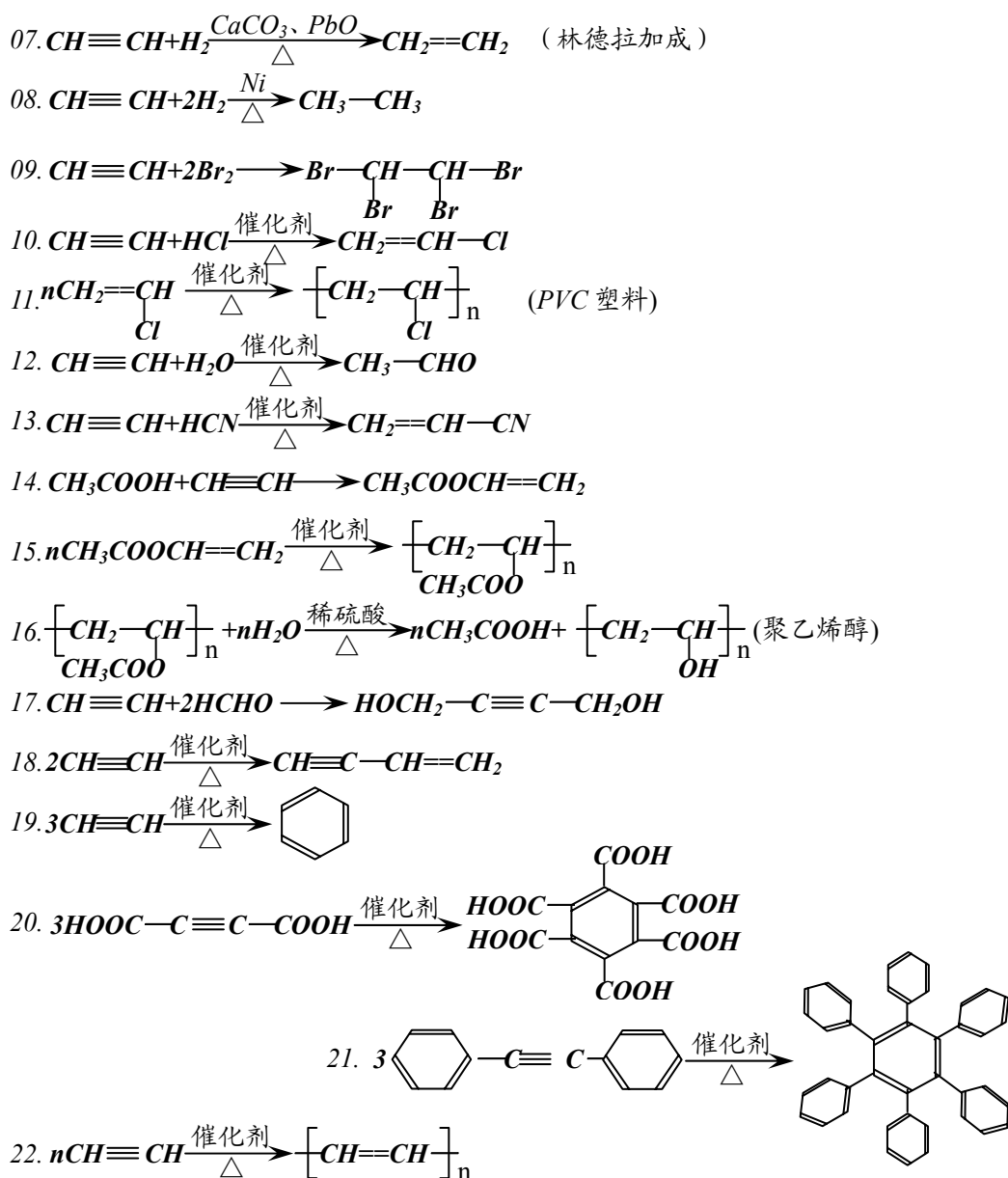


(碳碳双键的保护)

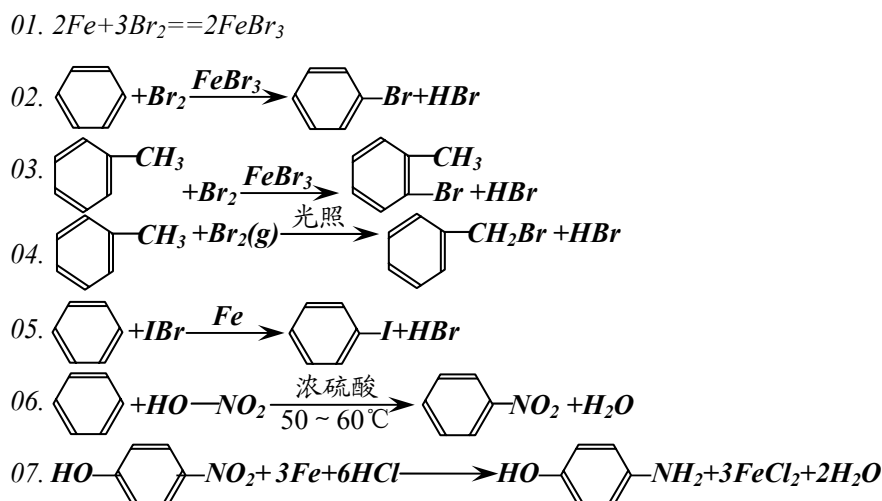


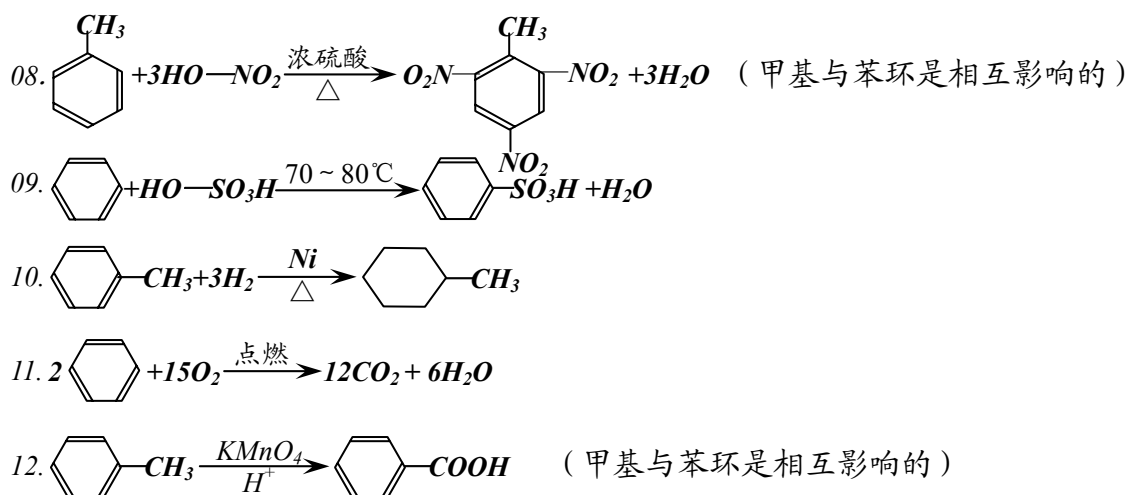
14、炔烃章节化学方程式



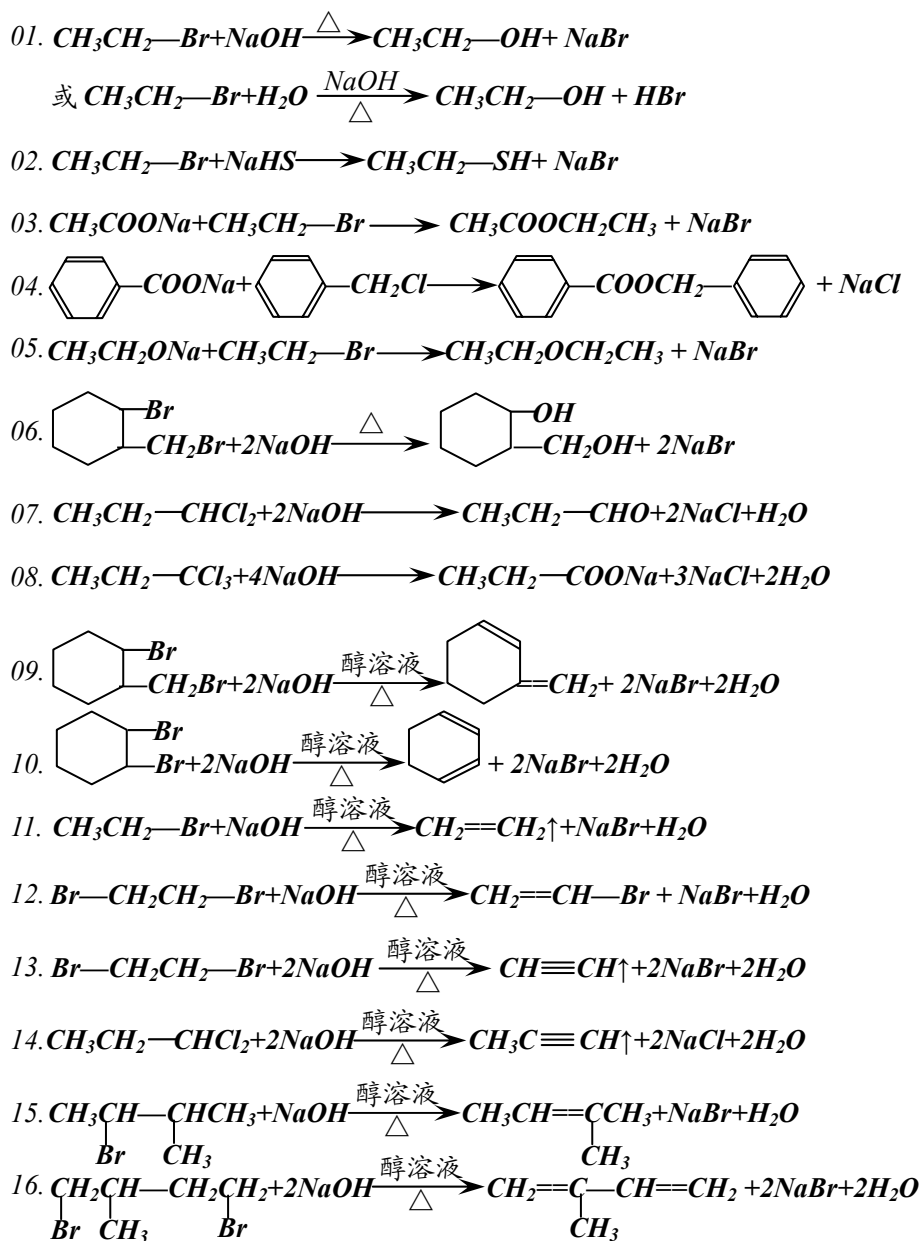


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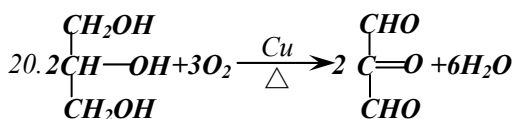
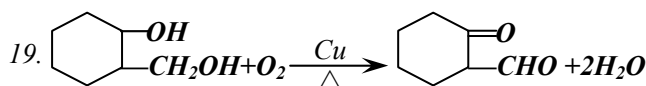
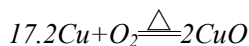
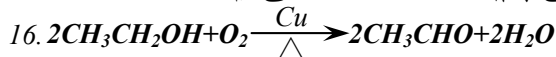
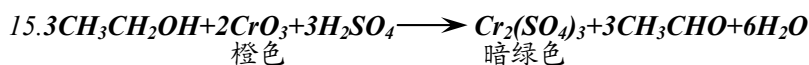
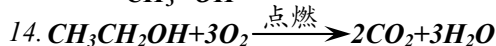
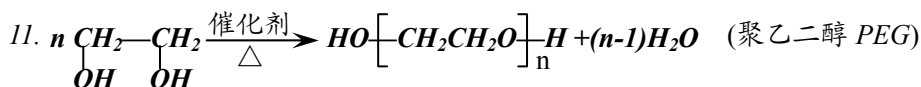
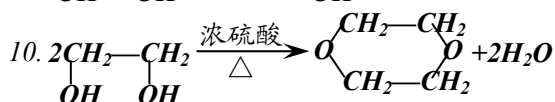
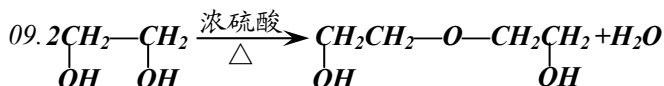
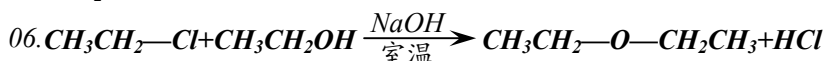
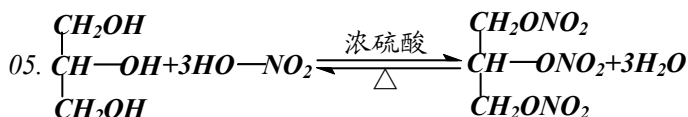
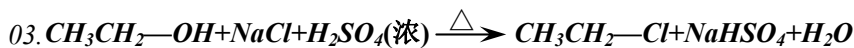
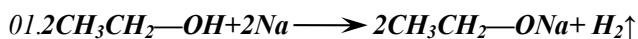




16、卤代烃章节化学方程式



17、醇醚章节化学方程式

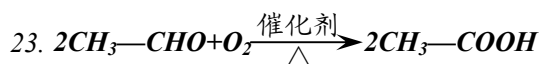
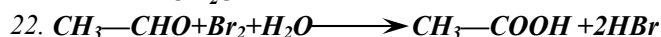
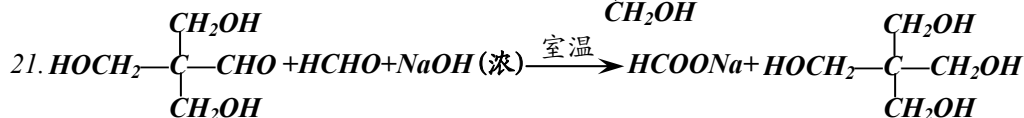
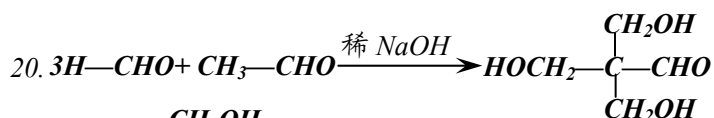
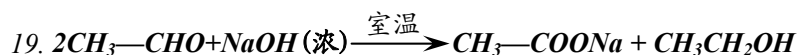
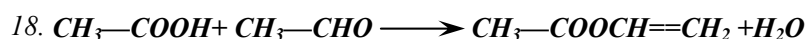
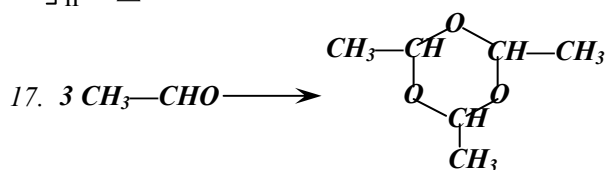
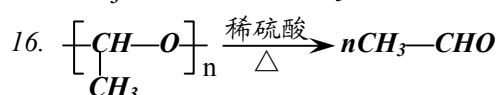
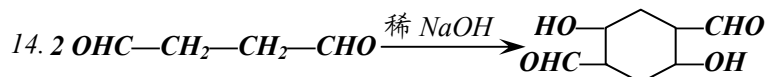
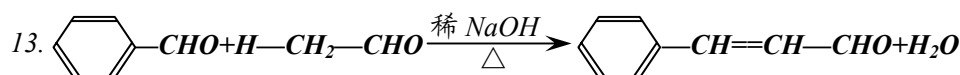
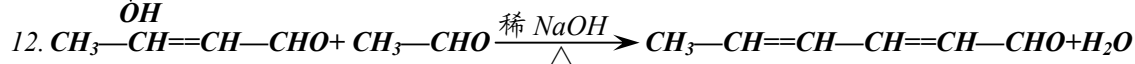
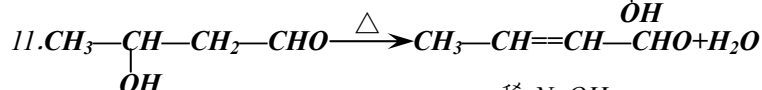
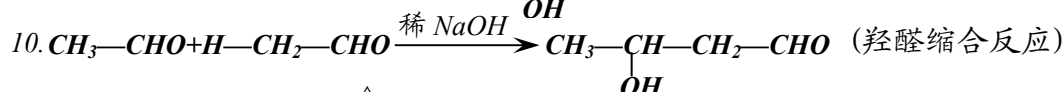
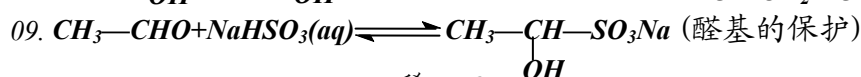
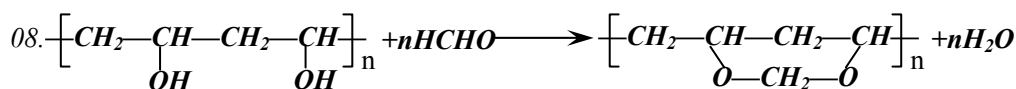
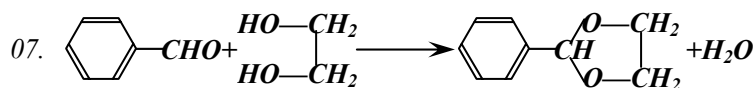
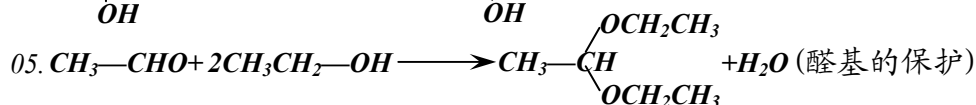
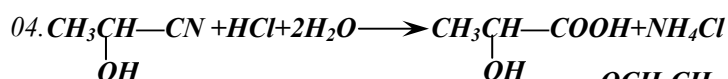


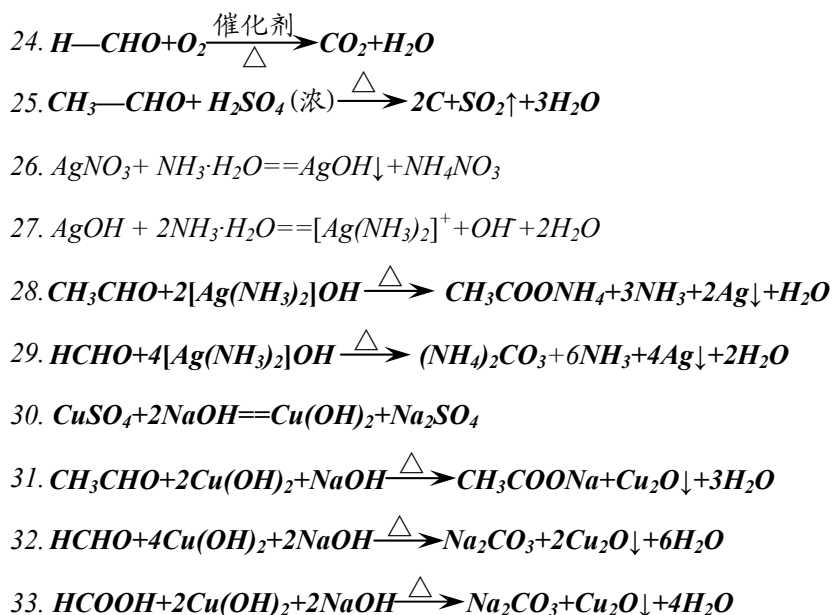
18、酚章节化学方程式

01. c1ccccc1O.[Na]OH>>c1ccccc1[O-].[Na+]O
02. c1ccccc1O.[Na]2C([O-])=O>>c1ccccc1[O-].[Na+]C([O-])=O
03. c1ccccc1O.[Na]2S>>c1ccccc1[O-].[Na+]S
04. c1ccccc1C(=O)[O-].[Na+]C([O-])=O.O>>c1ccccc1C(=O)[O-].O.[Na+]C([O-])=O
05. 2c1ccccc1[O-].[Na+]O.S(=O)(=O)O.O>>2c1ccccc1O.S(=O)(=O)[Na]2
06. c1ccccc1[O-].[Na+]O.S(=O)(=O)O.O>>c1ccccc1O.S(=O)(=O)[Na]
07. CC(=O)OC(=O)C1=CC=CC=C1C(=O)O.O=C1C=CC(=C1)C(=O)O>>CC(=O)OC1=CC=CC=C1C(=O)O.CC(=O)O (酚羟基的保护)
08. c1ccccc1O.CI>>c1ccccc1OC.CI (酚羟基的保护)
09. c1ccccc1OC.CI>>c1ccccc1O.CI
10. c1ccccc1O.BrBr.BrBr.BrBr>>c1ccccc1(Br)(Br)O.Br.Br.Br (羟基与苯环是相互影响的)
11. c1ccccc1O.O=[N+]([O-])O.O=[N+]([O-])O.O=[N+]([O-])O>>c1ccccc1([N+](=O)[O-])([N+](=O)[O-])[N+](=O)[O-].O.O.O (羟基与苯环是相互影响的)
12. $Fe^{3+} + 6C_6H_5-OH = [Fe(C_6H_5O)_6]^{3-} + 6H^+$
13. $n \text{ } \text{C}_6\text{H}_5\text{OH} + n\text{HCHO} \xrightarrow[\Delta]{H^+} \text{H} \left[\text{C}_6\text{H}_4(\text{OH})\text{CH}_2 \right]_n \text{OH} + (n-1)\text{H}_2\text{O}$
14. c1ccccc1Cl.O>>c1ccccc1O.Cl (加热加压, 催化剂)
15. 2c1ccccc1O.[Na]>>2c1ccccc1[O-].[Na+]O (苯环与羟基是相互影响的)

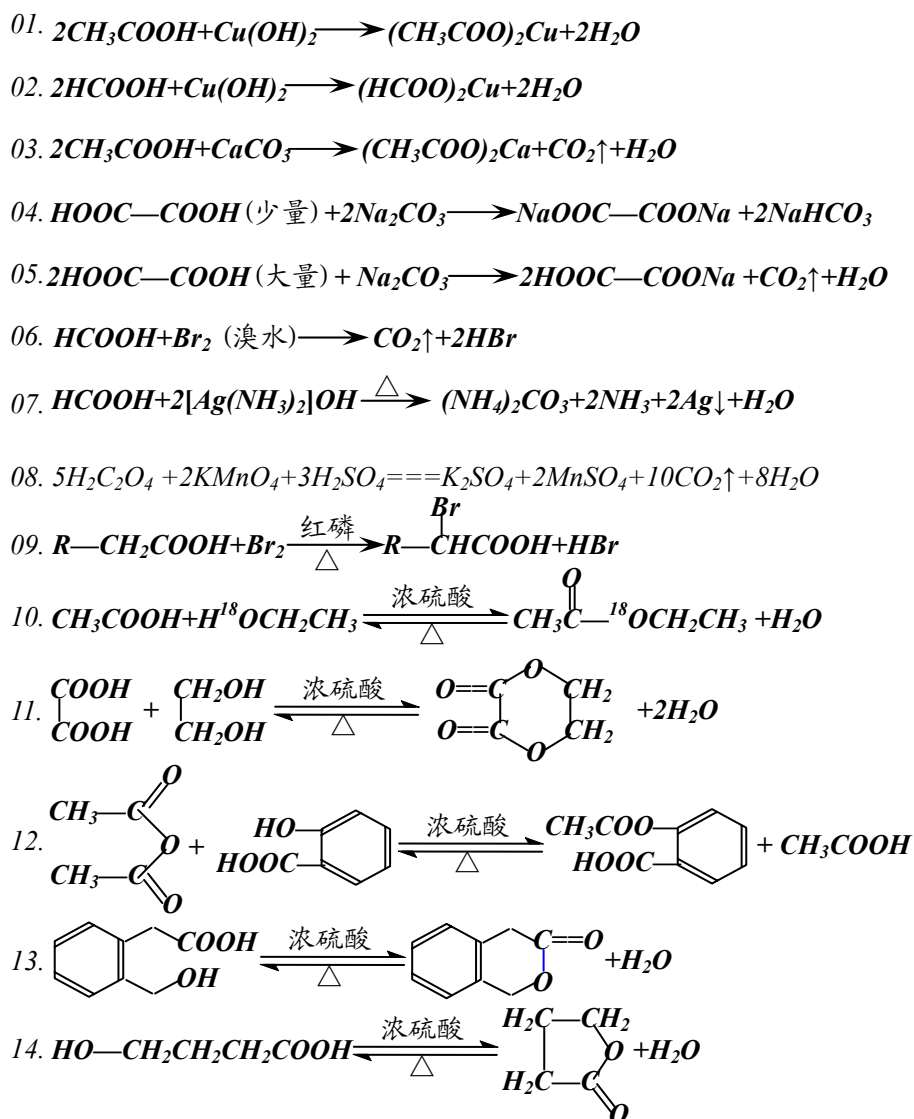
19、醛酮章节化学方程式

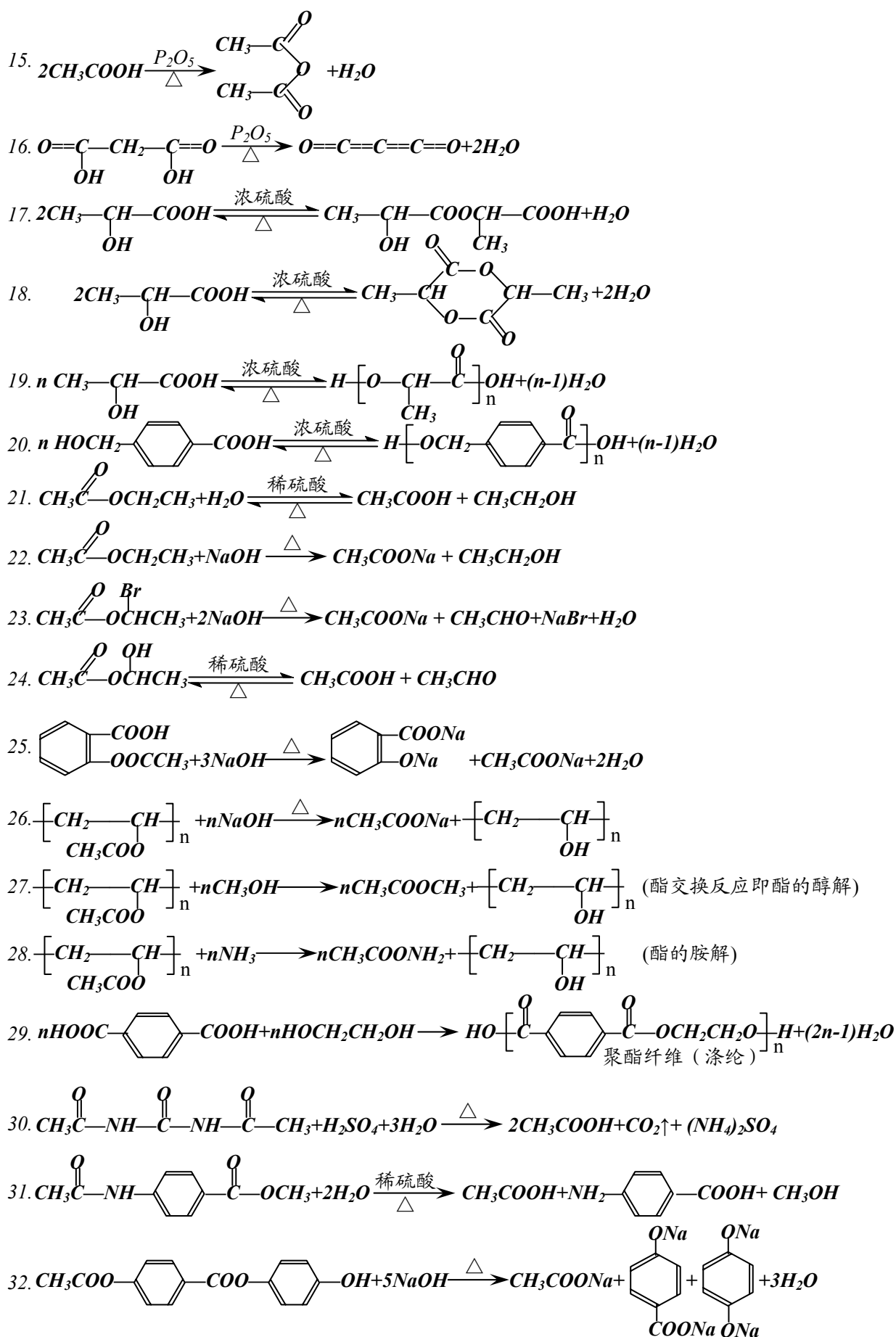
01. CC=O.O>>CCO (Ni, Δ)
02. CC=O.Cl>>CC(O)Cl (催化剂, Δ)

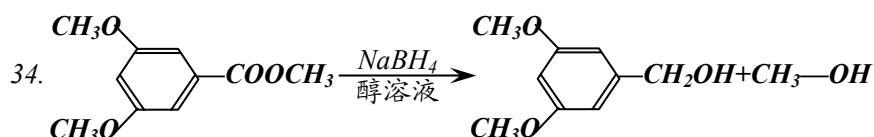




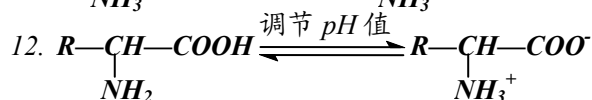
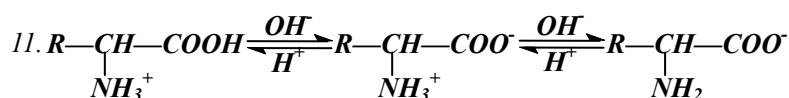
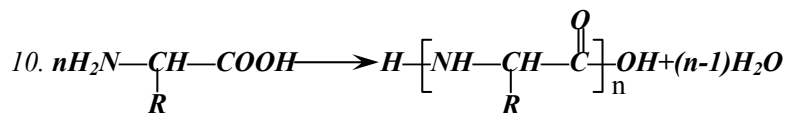
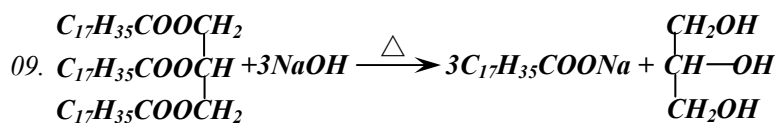
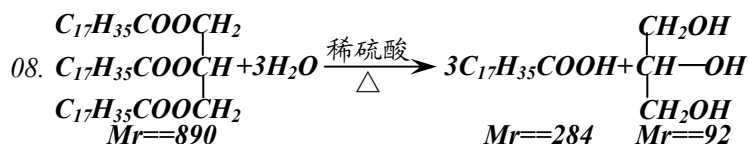
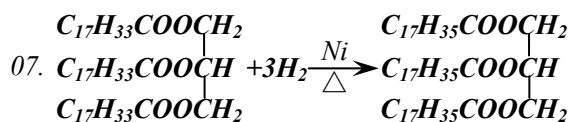
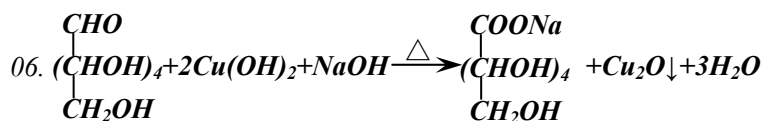
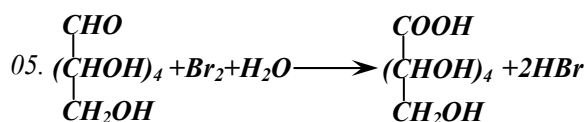
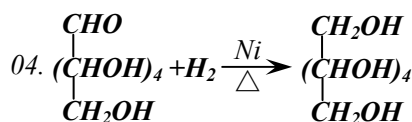
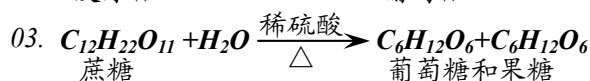
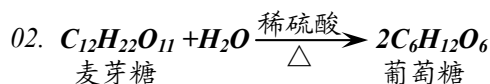
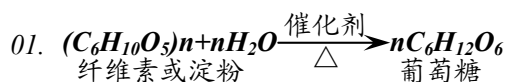
20、羧酸、酯类章节化学方程式







21、糖类、油脂、蛋白质章节化学方程式



可通过调节氨基酸水溶液的 pH 值，形成内盐（内盐在水中溶解度小）而析出晶体。