

Міністэрства адукацыі Рэспублікі Беларусь  
БЕЛАРУСКІ ДЗЯРЖАЎНЫ ТЭХНАЛАГІЧНЫ УНІВЕРСІТЭТ

Кафедра агульнай і неарганічнай хіміі

## **НЕАРГАЊІЧНАЯ ХІМІЯ**

**Метадычныя ўказанні для самастойнай работы па  
аднайменным курсе для студэнтаў  
спец. Т.14.01.00, Т.15.01.00, Т.15.02.00, Т.15.06.00**

Мінск 1999

**ЗМЕСТ**

I група, s-элементы (Э – Li, Na, K і інш.) .....	2
II група, s-элементы.....	3
III група, p-элементы.....	4
IV група, p-элементы.....	6
V група, p-элементы.....	8
VI група, p-элементы.....	10
VII група, p-элементы.....	11
I група, d-элементы.....	13
II група, d-элементы.....	13
VI група, d-элементы.....	14
VII група, d-элементы.....	15
VIII група, d-элементы.....	16

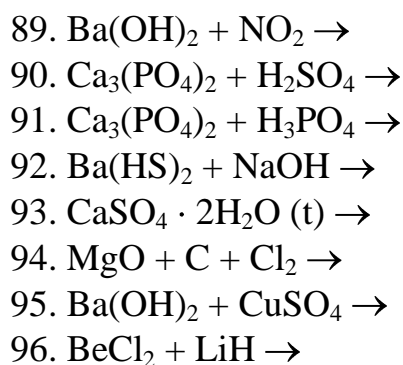
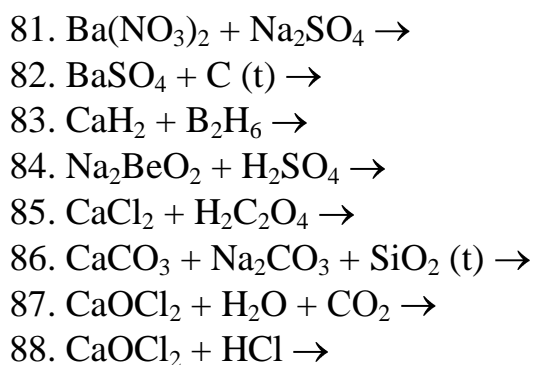
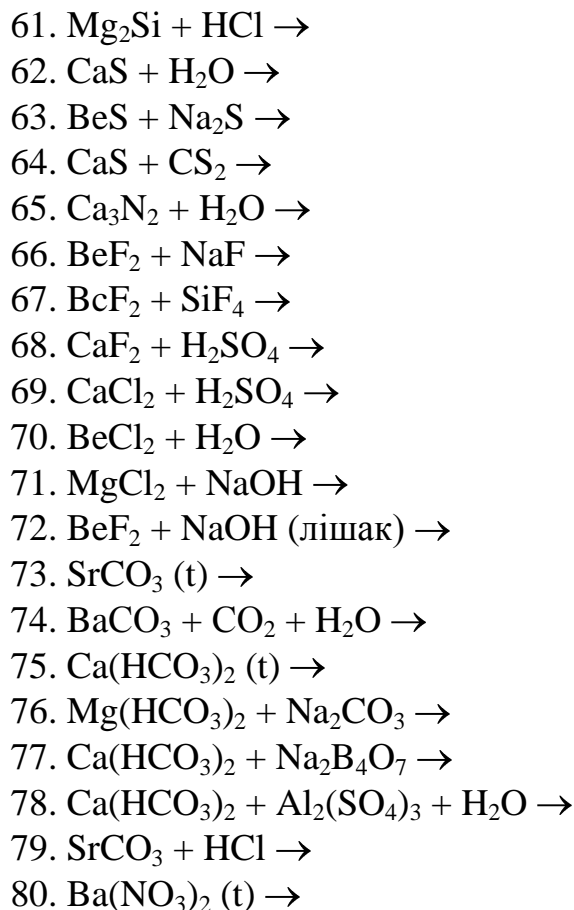
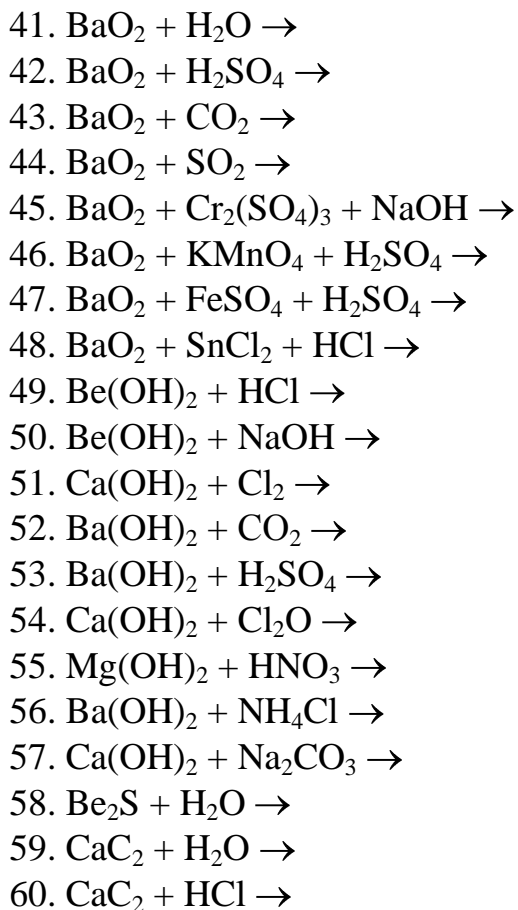
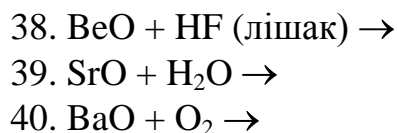
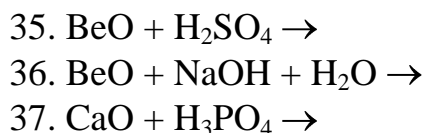
## I група, s-элементы (Э – Li, Na, K i інш.)

- |   |   |
|---|---|
| <p>1. Сернакислотны метад<br/> <math>\text{Li}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2 + \text{H}_2\text{SO}_4 (\text{t}) \rightarrow</math></p> <p>2. <math>\text{Li}_2\text{SO}_4 + \text{Na}_2\text{CO}_3 \rightarrow</math></p> <p>3. <math>\text{Li}_2\text{CO}_3 + \text{HCl} \rightarrow</math></p> <p>4. LiCl (электроліз) <math>\rightarrow</math></p> <p>5. Вапнавы метад<br/> <math>\text{Li}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2 + \text{CaCO}_3 \rightarrow</math></p> <p>6. <math>\text{LiAlO}_2 + \text{Ca}(\text{OH})_2 \rightarrow</math></p> <p>7. <math>\text{LiOH} + \text{HCl} \rightarrow</math></p> <p>8. Сульфатны метад<br/> <math>\text{Li}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2 + \text{K}_2\text{SO}_4 \rightarrow</math></p> <p>9. <math>\text{Li}_2\text{SO}_4 + \text{Na}_2\text{CO}_3 \rightarrow</math></p> <p>10. <math>\text{Li}_2\text{CO}_3 (\text{t}) \rightarrow</math></p> <p>11. <math>\text{Li}_2\text{O} + \text{Si} (\text{t}) \rightarrow</math></p> <p>12. <math>\text{Li} + \text{O}_2 \rightarrow</math></p> <p>13. <math>\text{Li} + \text{N}_2 \rightarrow</math></p> <p>14. <math>\text{Э} + \text{S} \rightarrow</math></p> <p>15. <math>\text{Э} + \text{C} \rightarrow</math></p> <p>16. <math>\text{Э} + \text{H}_2 \rightarrow</math></p> <p>17. <math>\text{Э} + \text{H}_2\text{O} \rightarrow</math></p> <p>18. <math>\text{LiH} + \text{O}_2 \rightarrow</math></p> <p>19. <math>\text{LiH} + \text{N}_2 \rightarrow</math></p> <p>20. <math>\text{ЭH} + \text{HCl} \rightarrow</math></p> | <p>21. <math>\text{ЭH} + \text{Cl}_2 \rightarrow</math></p> <p>22. <math>\text{ЭH} + \text{AlH}_3 \rightarrow</math></p> <p>23. <math>\text{ЭH} + \text{H}_2\text{O} \rightarrow</math></p> <p>24. <math>\text{LiOH} (\text{t}) \rightarrow</math></p> <p>25. <math>\text{LiNO}_3 \rightarrow</math></p> <p>26. <math>\text{Э}_2\text{O} + \text{H}_2\text{O} \rightarrow</math></p> <p>27. <math>\text{Э}_2\text{O} + \text{CO}_2 \rightarrow</math></p> <p>28. <math>\text{Э}_2\text{O} + \text{P}_2\text{O}_5 \rightarrow</math></p> <p>29. <math>\text{LiCl} + \text{H}_2\text{O}</math> (электроліз) <math>\rightarrow</math></p> <p>30. <math>\text{ЭOH} + \text{Cl}_2 \rightarrow</math></p> <p>31. <math>\text{ЭOH} + \text{S} \rightarrow</math></p> <p>32. <math>\text{ЭOH} + \text{P} + \text{H}_2\text{O} \rightarrow</math></p> <p>33. <math>\text{ЭOH} + \text{CO}_2 \rightarrow</math></p> <p>34. <math>\text{ЭOH} + \text{CO}_2 \rightarrow</math></p> <p>35. <math>\text{ЭOH} + \text{HCl} \rightarrow</math></p> <p>36. <math>\text{ЭOH} + \text{Be}(\text{OH})_2 \rightarrow</math></p> <p>37. <math>\text{ЭOH} + \text{ZnSO}_4 \rightarrow</math></p> <p>38. <math>\text{ЭOH} + \text{NH}_4\text{Cl} \rightarrow</math></p> <p>39. <math>\text{ЭF} + \text{AlF}_3 \rightarrow</math></p> <p>40. <math>\text{ЭF} + \text{SiF}_4 \rightarrow</math></p> |
| <p>41. NaCl (электроліз) <math>\rightarrow</math></p> <p>42. <math>\text{Na} + \text{O}_2 \rightarrow</math></p> <p>43. <math>\text{Na} + \text{NH}_3 \rightarrow</math></p> <p>44. <math>\text{Na} + \text{CH}_3\text{OH} \rightarrow</math></p> <p>45. <math>\text{Na}_2\text{O} + \text{O}_2 (\text{t}) \rightarrow</math></p> <p>46. <math>\text{Na}_2\text{O}_2 + \text{Na} \rightarrow</math></p> <p>47. <math>\text{Na}_2\text{O}_2 + \text{O}_2 (\text{t, p}) \rightarrow</math></p> <p>48. <math>\text{Na}_2\text{O}_2 + \text{H}_2\text{O} \rightarrow</math></p> <p>49. <math>\text{Na}_2\text{O}_2 + \text{CO}_2 \rightarrow</math></p> <p>50. <math>\text{Na}_2\text{O}_2 + \text{SO}_2 \rightarrow</math></p> <p>51. <math>\text{Na}_2\text{O}_2 + \text{KI} + \text{H}_2\text{SO}_4 \rightarrow</math></p> <p>52. <math>\text{Na}_2\text{O}_2 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow</math></p> <p>53. <math>\text{Na}_2\text{O}_2 + \text{Fe}(\text{OH})_2 + \text{H}_2\text{O} \rightarrow</math></p> <p>54. <math>\text{NaCl} + \text{H}_2\text{O} \rightarrow</math></p> <p>55. <math>\text{Na}_2\text{CO}_3 + \text{Ca}(\text{OH})_2 \rightarrow</math></p>  | <p>56. <math>\text{Э}_3\text{N} + \text{H}_2\text{O} \rightarrow</math></p> <p>57. Метад Леблана<br/> <math>\text{Na}_2\text{SO}_4 + \text{C} + \text{CaCO}_3 \rightarrow</math></p> <p>58. Метад Сальве<br/>           а) <math>\text{NH}_3 + \text{CO}_2 + \text{H}_2\text{O} \rightarrow</math><br/>           б) <math>\text{NaCl} + \text{NH}_4\text{HCO}_3 \rightarrow</math><br/>           в) <math>\text{NaHCO}_3 (\text{t}) \rightarrow</math><br/>           г) <math>\text{CaCO}_3 (\text{t}) \rightarrow</math><br/>           д) <math>\text{CaO} + \text{H}_2\text{O} \rightarrow</math><br/>           е) <math>\text{Ca}(\text{OH})_2 + \text{NH}_4\text{Cl} \rightarrow</math></p> <p>59. а) <math>\text{Na}_2\text{SO}_4 + \text{Ba}(\text{OH})_2 \rightarrow</math><br/>           б) <math>\text{NaOH} + \text{CO}_2 \rightarrow</math></p> <p>60. <math>\text{NaOH} + \text{Al} + \text{H}_2\text{O} \rightarrow</math></p> <p>61. <math>\text{NaNO}_3 (\text{t}) \rightarrow</math></p> <p>62. <math>\text{Na}_2\text{CO}_3 + \text{H}_2\text{O} \rightarrow</math></p>  |

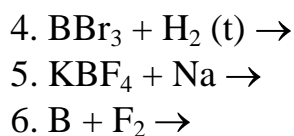
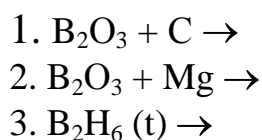
63.  $\text{Na}_2\text{CO}_3 + \text{SiO}_2 \rightarrow$   
 64.  $\text{Na}_2\text{CO}_3 + \text{CrCl}_3 + \text{H}_2\text{O} \rightarrow$   
 65.  $\text{Na}_2\text{S} + \text{HCl} \rightarrow$   
 66.  $\text{Na}_2\text{S} + \text{H}_2\text{O} \rightarrow$   
 67.  $\text{Na}_2\text{S} + \text{CS}_2 \rightarrow$   
 68.  $\text{Na}_2\text{CO}_3 + \text{CH}_3\text{COOH} \rightarrow$   
 69.  $\text{Na}_2\text{SiO}_3 + \text{CO}_2 + \text{H}_2\text{O} \rightarrow$   
 70.  $\text{NaH} + \text{CO}_2 \rightarrow$   
 71.  $\text{KCl}$  (электроліз)  $\rightarrow$   
 72.  $\text{KCl} + \text{Na} \rightarrow$   
 73.  $\text{KOH} + \text{Na} \rightarrow$   
 74.  $\text{KCl} + \text{Al} + \text{CaO}$  (t, вакуум)  $\rightarrow$   
 75.  $\text{KCl} + \text{Si} + \text{CaO}$  (t, вакуум)  $\rightarrow$   
 76.  $\text{K} + \text{O}_2 \rightarrow$   
 77.  $\text{K} + \text{O}_3 \rightarrow$   
 78.  $\text{K} + \text{Cl}_2 \rightarrow$   
 79.  $\text{KO}_2 + \text{K} \rightarrow$   
 80.  $\text{KO}_2 + \text{H}_2\text{O} \rightarrow$   
 81.  $\text{KO}_2 + \text{H}_2\text{SO}_4 \rightarrow$   
 82.  $\text{KO}_2 + \text{CO}_2 \rightarrow$   
 83.  $\text{KOH} + \text{O}_3 \rightarrow$   
 84.  $\text{KO}_3 \rightarrow$   
 85.  $\text{KO}_3 + \text{H}_2\text{O} \rightarrow$   
 86.  $\text{KNO}_3$  (t)  $\rightarrow$   
 87.  $\text{KHCO}_3 \rightarrow$   
 88.  $\text{K}_3\text{PO}_4 + \text{H}_2\text{O} \rightarrow$   
 89.  $\text{KO}_2 + \text{MnO}_2 + \text{H}_2\text{SO}_4 \rightarrow$   
 90.  $\text{CsCl} + \text{Ca}$  (t, вакуум)  $\rightarrow$   
 91.  $\text{Rb}_2\text{CO}_3 + \text{Mg}$  (t, вакуум)  $\rightarrow$   
 92.  $\text{CsCl} + \text{CaCl}_2$  (t, вакуум)  $\rightarrow$   
 93.  $\text{Na} + \text{NaNH}_2 \rightarrow$   
 94.  $\text{Na} + \text{Na}_2\text{NH} \rightarrow$   
 95.  $\text{NaNH}_2 + \text{H}_2\text{O} \rightarrow$   
 96.  $\text{Na}_2\text{NH} + \text{H}_2\text{O} \rightarrow$   
 97.  $\text{KOH} + \text{Cl}_2 \rightarrow$   
 98.  $\text{KO}_2 + \text{CO}_2 + \text{H}_2\text{O} \rightarrow$   
 99.  $\text{K}_2\text{HPO}_4 + \text{H}_2\text{O} \rightarrow$   
 100.  $\text{KOH} + \text{Zn} + \text{H}_2\text{O} \rightarrow$   
 101.  $\text{KOH} + \text{Si} + \text{H}_2\text{O} \rightarrow$

## II группа, s-элементы

1.  $\text{BeCl}_2$  (электроліз)  $\rightarrow$   
 2.  $\text{BeF}_2 + \text{Mg} \rightarrow$   
 3.  $\text{MgO} + \text{CaO} + \text{Si} \rightarrow$   
 4.  $\text{MgO} + \text{C} \rightarrow$   
 5.  $\text{MgCl}_2$  (электроліз)  $\rightarrow$   
 6.  $\text{CaF}_2$  (электроліз)  $\rightarrow$   
 7.  $\text{CaO} + \text{Al} \rightarrow$   
 8.  $\text{BaO} + \text{Al} \rightarrow$   
 9.  $\text{Be} + \text{O}_2 \rightarrow$   
 10.  $\text{Sr} + \text{O}_2 \rightarrow$   
 11.  $\text{Mg} + \text{Si} \rightarrow$   
 12.  $\text{Ca} + \text{S} \rightarrow$   
 13.  $\text{Ba} + \text{Cl}_2 \rightarrow$   
 14.  $\text{Mg} + \text{H}_2\text{O}$  (t)  $\rightarrow$   
 15.  $\text{Mg} + \text{B}_2\text{O}_3 \rightarrow$   
 16.  $\text{Mg} + \text{CO}_2 \rightarrow$   
 17.  $\text{Be} + \text{H}_2\text{SO}_4$  (p)  $\rightarrow$   
 18.  $\text{Ba} + \text{H}_2\text{SO}_4$  (к)  $\rightarrow$   
 19.  $\text{Mg} + \text{HNO}_3$  (p)  $\rightarrow$   
 20.  $\text{Ca} + \text{H}_2 \rightarrow$   
 21.  $\text{BeCl}_2 + \text{HI} \rightarrow$   
 22.  $\text{CaH}_2 + \text{O}_2 \rightarrow$   
 23.  $\text{BaH}_2 + \text{H}_2\text{O} \rightarrow$   
 24.  $\text{BeH}_2 + \text{NaH}_2 \rightarrow$   
 25.  $\text{CaH}_2 + \text{AlH}_3 \rightarrow$   
 26.  $\text{BaH}_2 + \text{CO}_2 \rightarrow$   
 27.  $\text{CaCO}_3$  (t)  $\rightarrow$   
 28.  $\text{Be}(\text{NO}_3)_2$  (t)  $\rightarrow$   
 29.  $\text{Mg}(\text{OH})_2$  (t)  $\rightarrow$   
 30.  $\text{CaO} + \text{C}$  (t)  $\rightarrow$   
 31.  $\text{BaO} + \text{CO}_2 \rightarrow$   
 32.  $\text{CaO} + \text{H}_2\text{O} \rightarrow$   
 33.  $\text{MgO} + \text{P}_2\text{O}_5 \rightarrow$   
 34.  $\text{SrO} + \text{SiO}_2 \rightarrow$



### III група, p-елементи



7.  $B + O_2 \rightarrow$   
 8.  $B + N_2 (t, p) \rightarrow$   
 9.  $B + Fe (t) \rightarrow$   
 10.  $B + H_2SO_4 \rightarrow$   
 11.  $B (\text{аморф.}) + KOH + H_2O \rightarrow$   
 12.  $B + HNO_3 + HF \rightarrow$   
 13.  $H_3BO_3 (t) \rightarrow$   
 14.  $Na_2O + B_2O_3 \rightarrow$   
 15.  $B_2O_3 + H_2O \rightarrow$   
 16.  $B_2O_3 + P_2O_5 \rightarrow$   
 17.  $B_2O_3 + NaOH \rightarrow$   
 18.  $B_2O_3 + HF \rightarrow$   
 19.  $B_2O_3 + CaF_2 + H_2SO_4 \rightarrow$   
 20.  $B_2O_3 + C + Cl_2 \rightarrow$   
 21.  $BF_3 + H_2O \rightarrow$   
 22.  $BCl_3 + H_2O \rightarrow$   
 23.  $BF_3 + NaF \rightarrow$   
 24.  $BCl_3 + AlCl_3 \rightarrow$   
 25.  $BF_3 + NH_3 \rightarrow$   
 26.  $BCl_3 + NH_3 \rightarrow$   
 27.  $MgB_2 + HCl \rightarrow$   
 28.  $NaBH_4 + BF_3 \rightarrow$   
 29.  $BCl_3 + H_2 \rightarrow$   
 30.  $B_2H_6 + F_2 \rightarrow$   
 31.  $B_2H_6 + O_2 \rightarrow$   
 32.  $B_2H_6 + H_2O \rightarrow$   
 33.  $B_2H_6 + HCl \rightarrow$   
 34.  $B_2H_6 + NaOH \rightarrow$   
 35.  $B_2H_6 + KMnO_4 + H_2SO_4 \rightarrow$   
 36.  $HBO_2 (t) \rightarrow$   
 37.  $HBO_2 + H_2O \rightarrow$   
 38.  $HBO_2 + NaOH \rightarrow$   
 39.  $HBO_2 + CaO (t) \rightarrow$   
 40.  $Na_2B_4O_7 + HCl + H_2O \rightarrow$   
 41.  $H_3BO_3 + H_2O \rightarrow$   
 42.  $H_3BO_3 + HF \rightarrow$   
 43.  $H_3BO_3 + NaOH (t) \rightarrow$   
 44.  $H_3BO_3 + NaOH (p-p) \rightarrow$   
 45.  $H_3BO_3 + Na_2CO_3 \rightarrow$   
 46.  $Na_2B_4O_7 + H_2O \rightarrow$   
 47.  $Na_2B_4O_7 + CuO \rightarrow$   
 48.  $Na_2B_4O_7 + Fe_2O_3 (t) \rightarrow$   
 49.  $Al_2O_3 (t, \text{электрoлiз}) \rightarrow$   
 50.  $Al + F_2 \rightarrow$   
 51.  $Al + O_2 \rightarrow$   
 52.  $Al + C \rightarrow$   
 53.  $Al + S \rightarrow$   
 54.  $Al(Hg) + H_2O \rightarrow$   
 55.  $Al + Fe_3O_4 \rightarrow$   
 56.  $Al + NH_3 \rightarrow$   
 57.  $Al + C_2H_2 \rightarrow$   
 58.  $Al + WO_3 \rightarrow$   
 59.  $Al + HCl \rightarrow$   
 60.  $Al + HNO_3 (p) \rightarrow$   
 61.  $Al + NaOH + H_2O \rightarrow$   
 62.  $Al + AlF_3 \rightarrow$   
 63.  $Al + NH_4Cl + H_2O \rightarrow$   
 64.  $Al + Na_2CO_3 + H_2O \rightarrow$   
 65.  $Al + KNO_3 + KOH \rightarrow$   
 66.  $Al + NO_2 + HCl \rightarrow$   
 67.  $Al + K_2CrO_4 + KOH + H_2O \rightarrow$   
 68.  $Al + K_2Cr_2O_7 + HCl \rightarrow$   
 69.  $AlCl_3 + LiH \rightarrow$   
 70.  $AlH_3 + H_2O \rightarrow$   
 71.  $AlH_3 + HCl \rightarrow$   
 72.  $AlH_3 + NaOH \rightarrow$   
 73.  $AlH_3 + LiH \rightarrow$   
 74.  $AlH_3 + B_2H_6 \rightarrow$   
 75.  $NaAlH_4 + H_2O \rightarrow$   
 76.  $Al(OH)_3 (t) \rightarrow$   
 77.  $Al_2O_3 + F_2 \rightarrow$   
 78.  $Al_2O_3 + K \rightarrow$   
 79.  $Al_2O_3 + CaO (t) \rightarrow$   
 80.  $Al_2O_3 + H_2SO_4 \rightarrow$   
 81.  $Al_2O_3 + HF \rightarrow$   
 82.  $Al_2O_3 + KOH (t) \rightarrow$   
 83.  $Al_2O_3 + Na_2CO_3 (t) \rightarrow$   
 84.  $Al_2O_3 + K_2S_2O_7 (t) \rightarrow$   
 85.  $Al_2(SO_4)_3 + KOH \rightarrow$   
 86.  $Al(OH)_3 + CH_3COOH \rightarrow$

87.  $\text{Al}(\text{OH})_3 + \text{HF} + \text{Na}_2\text{CO}_3 \rightarrow$   
 88.  $\text{Al}(\text{OH})_3 + \text{NaOH} \rightarrow$   
 89.  $\text{K}_3\text{Al}(\text{OH})_6 + \text{HCl} \rightarrow$   
 90.  $\text{Na}_3\text{Al}(\text{OH})_6 + \text{CO}_2 \rightarrow$   
 91.  $\text{Al}_2(\text{SO}_4)_3 + \text{H}_2\text{O} \rightarrow$   
 92.  $\text{AlCl}_3 + \text{NaOH}$  (лішак)  $\rightarrow$   
 93.  $\text{KAl}(\text{SO}_4)_2 + \text{H}_2\text{O} \rightarrow$   
 94.  $\text{AlF}_3 + \text{NaF} \rightarrow$   
 95.  $\text{AlCl}_3 + \text{NaCl} \rightarrow$   
 96.  $\text{AlCl}_3 + \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} \rightarrow$   
 97.  $\text{Al}_2(\text{SO}_4)_3 + \text{Ca}(\text{HCO}_3)_2 \rightarrow$   
 98.  $\text{AlH}_3 + \text{KOH} + \text{H}_2\text{O} \rightarrow$   
 99.  $\text{Al}_4\text{C}_3 + \text{H}_2\text{O} \rightarrow$   
 100.  $\text{Al}_2(\text{C}_2)_3 + \text{KOH} + \text{H}_2\text{O} \rightarrow$   
 101.  $\text{Ga} + \text{NaOH} + \text{H}_2\text{O} \rightarrow$   
 102.  $\text{Ga}_2\text{O}_3 + \text{HCl} \rightarrow$   
 103.  $\text{Tl} + \text{O}_2 \rightarrow$   
 104.  $\text{Tl}_2\text{O}_3$  (t)  $\rightarrow$   
 105.  $\text{In}(\text{OH})_3 + \text{KOH} \rightarrow$   
 106.  $\text{Tl}_2\text{O} + \text{H}_2\text{O} \rightarrow$   
 107.  $\text{TlCl} + \text{TlCl}_3 \rightarrow$   
 108.  $\text{Tl}_2\text{SO}_4 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow$   
 109.  $\text{TlCl}_3 + \text{H}_2\text{S} \rightarrow$

#### IV група, р-елементи

1.  $\text{C} + \text{O}_2 \rightarrow$   
 2.  $\text{C} + \text{H}_2\text{O}$  (t)  $\rightarrow$   
 3.  $\text{C} + \text{Si}$  (t)  $\rightarrow$   
 4.  $\text{C} + \text{CO}_2 \rightarrow$   
 5.  $\text{C} + \text{H}_2$  (t)  $\rightarrow$   
 6.  $\text{C} + \text{SiO}_2 \rightarrow$   
 7.  $\text{C} + \text{CaO}$  (t)  $\rightarrow$   
 8.  $\text{C}_2\text{H}_2 + \text{Zn} \rightarrow$   
 9.  $\text{C}_2\text{H}_2 + \text{AgNO}_3 \rightarrow$   
 10.  $\text{Be}_2\text{C} + \text{H}_2\text{O} \rightarrow$   
 11.  $\text{Al}_4\text{C}_3 + \text{H}_2\text{O} \rightarrow$   
 12.  $\text{CaC}_2 + \text{H}_2\text{O} \rightarrow$   
 13.  $\text{Al}_2(\text{C}_2)_3 + \text{H}_2\text{O} \rightarrow$   
 14.  $\text{LaC}_2 + \text{H}_2\text{O} \rightarrow$   
 15.  $\text{Mn}_3\text{C} + \text{H}_2\text{O} \rightarrow$   
 16.  $\text{CH}_3\text{COONa} + \text{NaOH}$  (t)  $\rightarrow$   
 17.  $\text{HCOOH} \rightarrow$   
 18.  $\text{CO} + \text{Ni} \rightarrow$   
 19.  $\text{CO} + \text{Fe} \rightarrow$   
 20.  $\text{CO} + \text{Mn} \rightarrow$   
 21.  $\text{CO} + \text{Cr} \rightarrow$   
 22.  $\text{Mo}(\text{CO})_6$  (t)  $\rightarrow$   
 23.  $\text{CO} + \text{Cl}_2 \rightarrow$   
 24.  $\text{CO} + \text{S} \rightarrow$   
 25.  $\text{CO} + \text{CuO} \rightarrow$   
 26.  $\text{CO} + \text{Fe}_2\text{O}_3 \rightarrow$   
 27.  $\text{CO} + \text{NH}_3 \rightarrow$   
 28.  $\text{CO} + \text{NaOH} \rightarrow$   
 29.  $\text{CaCO}_3$  (t)  $\rightarrow$   
 30.  $\text{CaCO}_3 + \text{HCl} \rightarrow$   
 31.  $\text{CO}_2 + \text{Mg} \rightarrow$   
 32.  $\text{CO}_2 + \text{F}_2 \rightarrow$   
 33.  $\text{CO}_2 + \text{BaO}_2 \rightarrow$   
 34.  $\text{CO}_2 + \text{H}_2\text{O} \rightarrow$   
 35.  $\text{CO}_2 + \text{NaOH} \rightarrow$   
 36.  $\text{CO}_2$  (лішак) +  $\text{NaOH} \rightarrow$   
 37.  $\text{CO}_2 + \text{NH}_3$  (t, ct, p)  $\rightarrow$   
 38.  $\text{CO}_2 + \text{Ba}(\text{OH})_2 \rightarrow$   
 39.  $\text{COCl}_2 + \text{H}_2\text{O}$  (t)  $\rightarrow$   
 40.  $\text{COS} + \text{H}_2\text{O} \rightarrow$   
 41.  $\text{CO}_2 + \text{Na}_2\text{O} \rightarrow$   
 42.  $\text{CS}_2 + \text{Na}_2\text{S} \rightarrow$   
 43.  $\text{NaHCO}_3$  (t)  $\rightarrow$   
 44.  $\text{Al}_2(\text{CO}_3)_3$  (t)  $\rightarrow$   
 45.  $(\text{CuOH})_2\text{CO}_3$  (t)  $\rightarrow$   
 46.  $\text{CaCO}_3 + \text{CO}_2 + \text{H}_2\text{O} \rightarrow$   
 47.  $\text{K}_2\text{CO}_3 + \text{H}_2\text{O} \rightarrow$   
 48.  $\text{AgCN}$  (t)  $\rightarrow$   
 49.  $\text{Hg}(\text{CN})_2$  (t)  $\rightarrow$   
 50.  $\text{C}_2\text{N}_2 + \text{H}_2 \rightarrow$

51.  $C_2N_2 + KOH \rightarrow$   
 52.  $CH_4 + NH_3 + O_2 (t, ct) \rightarrow$   
 53.  $C + NH_3 + Na_2CO_3 \rightarrow$   
 54.  $NaNH_2 + C (t) \rightarrow$   
 55.  $NaCN + H_2O \rightarrow$   
 56.  $KCN + FeCl_2 \rightarrow$   
 57.  $K_4[Fe(CN)_6] + Cl_2 \rightarrow$   
 58.  $KCN + S (t) \rightarrow$   
 59.  $CS_2 + NH_3 + Ca(OH)_2 \rightarrow$   
 60.  $H_2C_2O_4 + Ca(OH)_2 \rightarrow$   
 61.  $H_2C_2O_4 + KMnO_4 + H_2SO_4 \rightarrow$   
 62.  $C_2N_2 + KOH \rightarrow$   
 63.  $H_2C_2O_4 + KNO_3 \rightarrow$   
 64.  $CO_2 + Na_2O_2 \rightarrow$   
 65.  $SiO_2 + Mg \rightarrow$   
 66.  $SiH_4 (t) \rightarrow$   
 67.  $SiCl_4 + H_2 \rightarrow$   
 68.  $SiCl_4 + Zn (t) \rightarrow$   
 69.  $Si + F_2 \rightarrow$   
 70.  $Si + Mg (t) \rightarrow$   
 71.  $Si + H_2O (t) \rightarrow$   
 72.  $Si + KOH + H_2O \rightarrow$   
 73.  $Si + HF + HNO_3 \rightarrow$   
 74.  $Mg_2Si + H_2SO_4 (y \text{ эфирь}) \rightarrow$   
 75.  $Mg_2Si + NH_4Br \rightarrow$   
 76.  $SiCl_4 + LiAlH_4 (y \text{ эфирь}) \rightarrow$   
 77.  $SiH_4 + O_2 \rightarrow$   
 78.  $SiH_4 + H_2O (t) \rightarrow$   
 79.  $SiH_4 + NaOH + H_2O \rightarrow$   
 80.  $SiO_2 + C + Cl_2 (t) \rightarrow$   
 81.  $SiO_2 + CaF_2 + H_2SO_4 \rightarrow$   
 82.  $SiC + Cl_2 (t) \rightarrow$   
 83.  $SiF_4 + H_2O \rightarrow$   
 84.  $SiCl_4 + H_2O \rightarrow$   
 85.  $SiF_4 + AlF_3 \rightarrow$   
 86.  $SiO_2 + Si (t) \rightarrow$   
 87.  $SiO_2 + CuO (t) \rightarrow$   
 88.  $SiO_2 + NaOH \rightarrow$   
 89.  $SiO_2 + HF \rightarrow$   
 90.  $Na_2SiO_3 + CO_2 + H_2O \rightarrow$   
 91.  $SiC + NaOH + O_2 (t) \rightarrow$   
 92.  $Na_2CO_3 + CaCO_3 + SiO_2 (t) \rightarrow$   
 93.  $Na_2SO_4 + C + CaCO_3 + SiO_2 (t) \rightarrow$   
 94.  $GeO_2 + H_2 \rightarrow$   
 95.  $Ge + NaOH + H_2O_2 \rightarrow$   
 96.  $Ge + HNO_3 (к) \rightarrow$   
 97.  $Ge + O_2 \rightarrow$   
 98.  $Ge + GeO_2 \rightarrow$   
 99.  $GeO_2 + KOH + H_2O \rightarrow$   
 100.  $SnO_2 + C \rightarrow$   
 101.  $Sn + HCl \rightarrow$   
 102.  $Sn + H_2SO_4 (к) \rightarrow$   
 103.  $Sn + HNO_3 (к) \rightarrow$   
 104.  $Sn + HNO_3 (p) \rightarrow$   
 105.  $Sn + KOH + H_2O \rightarrow$   
 106.  $Sn(OH)_2 (t) \rightarrow$   
 107.  $SnO + KOH + H_2O \rightarrow$   
 108.  $SnO + HCl \rightarrow$   
 109.  $SnO + NaClO + NaOH \rightarrow$   
 110.  $SnCl_2 + H_2O \rightarrow$   
 111.  $SnCl_2 + NaOH \rightarrow$   
 112.  $SnCl_2 + NaOH (лишак) \rightarrow$   
 113.  $SnCl_2 + H_2O_2 + HCl \rightarrow$   
 114.  $SnCl_2 + HgCl_2 \rightarrow$   
 115.  $SnCl_2 + NaCl \rightarrow$   
 116.  $SnCl_2 + H_2S \rightarrow$   
 117.  $SnS + (NH_4)_2S_2 \rightarrow$   
 118.  $Sn + O_2 \rightarrow$   
 119.  $SnO_2 + Sn \rightarrow$   
 120.  $SnO_2 + NaOH + H_2O \rightarrow$   
 121.  $SnCl_4 + H_2S \rightarrow$   
 122.  $SnCl_4 + HCl \rightarrow$   
 123.  $SnCl_4 + NH_4OH \rightarrow$   
 124.  $SnCl_4 + Zn \rightarrow$



125.  $\text{PbS} + \text{O}_2 \rightarrow$   
 126.  $\text{PbO} + \text{CO} \rightarrow$   
 127.  $\text{Pb} + \text{O}_2 \rightarrow$   
 128.  $\text{Pb} + \text{HNO}_3 (\kappa) \rightarrow$   
 129.  $\text{Pb} + \text{KOH} + \text{H}_2\text{O} \rightarrow$   
 130.  $\text{Pb} + \text{H}_2\text{SeO}_4 (\kappa) \rightarrow$   
 131.  $\text{Pb}(\text{NO}_3)_2 + \text{NaOH} \rightarrow$   
 132.  $\text{Pb}(\text{OH})_2 (\text{t}) \rightarrow$   
 133.  $\text{Pb}(\text{NO}_3)_2 (\text{t}) \rightarrow$   
 134.  $\text{PbO} + \text{HNO}_3 \rightarrow$   
 135.  $\text{PbO} + \text{NaOH} + \text{H}_2\text{O} \rightarrow$   
 136.  $\text{PbO} + \text{PbO}_2 \rightarrow$   
 137.  $\text{Pb}_3\text{O}_4 + \text{HNO}_3 \rightarrow$   
 138.  $\text{Pb}_3\text{O}_4 + \text{HCl} \rightarrow$   
 139.  $\text{Pb}_3\text{O}_4 + \text{KOH} + \text{H}_2\text{O} \rightarrow$   
 140.  $\text{Pb}_3\text{O}_4 + \text{KI} + \text{H}_2\text{SO}_4 \rightarrow$   
 141.  $\text{Pb}(\text{CH}_3\text{COO})_2 + \text{CaOCl}_2 + \text{H}_2\text{O} \rightarrow$   
 142.  $\text{Pb}(\text{CH}_3\text{COO})_2 + \text{Cl}_2 + \text{K}_2\text{CO}_3 \rightarrow$   
 143.  $\text{Pb}(\text{CH}_3\text{COO})_2 + \text{Na}_2\text{CrO}_4 \rightarrow$   
 144.  $\text{PbO}_2 + \text{HCl} \rightarrow$   
 145.  $\text{PbO}_2 + \text{NaOH} + \text{H}_2\text{O} \rightarrow$   
 146.  $\text{PbO}_2 + \text{KBr} + \text{H}_2\text{SO}_4 \rightarrow$   
 147.  $\text{PbO}_2 + \text{SO}_2 \rightarrow$   
 148.  $\text{PbS} + \text{H}_2\text{O}_2 \rightarrow$   
 149.  $\text{PbO}_2 + \text{Na}_2[\text{Sn}(\text{OH})_4] + \text{NaOH} + \text{H}_2\text{O} \rightarrow$

### V группа, p-элементы

1.  $\text{N}_2 + \text{H}_2 (\text{t, p, Pt}) \rightarrow$   
 2.  $\text{N}_2 + \text{O}_2 (\text{t}) \rightarrow$   
 3.  $\text{N}_2 + \text{Li} \rightarrow$   
 4.  $\text{N}_2 + \text{Mg} (\text{t}) \rightarrow$   
 5.  $\text{Li}_3\text{N} + \text{AlN} \rightarrow$   
 6.  $\text{Na}_3\text{N} + \text{Si}_3\text{N}_4 \rightarrow$   
 7.  $\text{Mg}_3\text{N}_2 + \text{H}_2\text{O} \rightarrow$   
 8.  $\text{Cl}_3\text{N} + \text{H}_2\text{O} \rightarrow$   
 9.  $\text{NH}_3 + \text{O}_2 \rightarrow$   
 10.  $\text{NH}_3 + \text{O}_2 (\text{Pt}) \rightarrow$   
 11.  $\text{NH}_3 + \text{F}_2 \rightarrow$   
 12.  $\text{NH}_3 + \text{Na} \rightarrow$   
 13.  $\text{NaNH}_2 + \text{Na} \rightarrow$   
 14.  $\text{Na}_2\text{NH} + \text{Na} \rightarrow$   
 15.  $\text{NH}_3 + \text{H}_2\text{O} \rightarrow$   
 16.  $\text{NaNH}_2 + \text{H}_2\text{O} \rightarrow$   
 17.  $\text{NH}_3 + \text{CuO} (\text{t}) \rightarrow$   
 18.  $\text{NH}_3 + \text{CO} (\text{t, p}) \rightarrow$   
 19.  $\text{NH}_3 + \text{CO}_2 (\text{t, p}) \rightarrow$   
 20.  $\text{NH}_3 + \text{H}_2\text{S} \rightarrow$   
 21.  $\text{NH}_3 + \text{H}_3\text{PO}_4 \rightarrow$   
 22.  $\text{NH}_3 + \text{BF}_3 \rightarrow$   
 23.  $\text{NH}_3 + \text{Zn}(\text{OH})_2 \rightarrow$   
 24.  $\text{NH}_3 + \text{CuSO}_4 \rightarrow$   
 25.  $\text{NH}_3 + \text{NaClO} \rightarrow$   
 26.  $\text{NH}_4\text{Cl} (\text{t}) \rightarrow$   
 27.  $(\text{NH}_4)_3\text{PO}_4 (\text{t}) \rightarrow$   
 28.  $(\text{NH}_4)_2\text{CO}_3 (\text{t}) \rightarrow$   
 29.  $(\text{NH}_4)_2\text{Cr}_2\text{O}_7 (\text{t}) \rightarrow$   
 30.  $\text{NH}_4\text{NO}_2 (\text{t}) \rightarrow$   
 31.  $\text{NH}_4\text{NO}_3 (\text{t}) \rightarrow$   
 32.  $\text{NH}_4\text{Cl} + \text{H}_2\text{O} \rightarrow$   
 33.  $\text{NH}_4\text{Cl} + \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} \rightarrow$   
 34.  $\text{NH}_4\text{Cl} + \text{Ca}(\text{OH})_2 \rightarrow$   
 35.  $\text{N}_2\text{H}_4 + \text{O}_2 \rightarrow$   
 36.  $\text{N}_2\text{H}_4 + \text{Cl}_2 \rightarrow$   
 37.  $\text{N}_2\text{H}_4 + \text{H}_2\text{SO}_4 \rightarrow$   
 38.  $\text{N}_2\text{H}_4 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow$   
 39.  $\text{N}_2\text{H}_4 + \text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4 \rightarrow$   
 40.  $\text{N}_2\text{H}_4 + \text{Al} + \text{KOH} + \text{H}_2\text{O} \rightarrow$   
 41.  $\text{N}_2\text{H}_4 + \text{HNO}_2 \rightarrow$   
 42.  $\text{NH}_2\text{OH} \rightarrow$   
 43.  $\text{NH}_2\text{OH} + \text{O}_2 \rightarrow$   
 44.  $\text{NH}_2\text{OH} + \text{HCl} \rightarrow$

45.  $\text{NH}_2\text{OH} + \text{K}_2\text{Cr}_2\text{O}_7 + \text{HCl} \rightarrow$   
 46.  $\text{NH}_2\text{OH} + \text{FeSO}_4 + \text{H}_2\text{SO}_4 \rightarrow$   
 47.  $\text{NO} + \text{O}_2 \rightarrow$   
 48.  $\text{NO} + \text{Cl}_2 \rightarrow$   
 49.  $\text{NO} + \text{NO}_2 \rightarrow$   
 50.  $\text{NO} + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow$   
 51.  $\text{NO} + \text{H}_2\text{O} + \text{HClO} \rightarrow$   
 52.  $\text{N}_2\text{O}_3 + \text{H}_2\text{O} \rightarrow$   
 53.  $\text{N}_2\text{O}_3 + \text{Ba}(\text{OH})_2 \rightarrow$   
 54.  $\text{NO}_2 + \text{O}_3 \rightarrow$   
 55.  $\text{NO}_2 + \text{H}_2\text{O} \rightarrow$   
 56.  $\text{NO}_2 + \text{Ca}(\text{OH})_2 \rightarrow$   
 57.  $\text{NO}_2 + \text{O}_2 + \text{H}_2\text{O} \rightarrow$   
 58.  $\text{HNO}_2 \rightarrow$   
 59.  $\text{HNO}_2 + \text{P}_2\text{O}_5 \rightarrow$   
 60.  $\text{NaNO}_2 + \text{KMnO}_4 + \text{H}_2\text{O} \rightarrow$   
 61.  $\text{NaNO}_2 + \text{KI} + \text{H}_2\text{SO}_4 \rightarrow$   
 62.  $\text{NaNO}_2 + \text{H}_2\text{O} \rightarrow$   
 63.  $\text{NaNO}_2 + \text{Zn} + \text{NaOH} \rightarrow$   
 64.  $\text{KNO}_2 + \text{PbO}_2 + \text{H}_2\text{SO}_4 \rightarrow$   
 65.  $\text{N}_2\text{O}_5 \rightarrow$   
 66.  $\text{N}_2\text{O}_5 + \text{Sr}(\text{OH})_2 \rightarrow$   
 67.  $\text{HNO}_3$  (свет)  $\rightarrow$   
 68.  $\text{HNO}_3 + \text{P}_2\text{O}_5 \rightarrow$   
 69.  $\text{HNO}_3$  (моц.р) +  $\text{Mg} \rightarrow$   
 70.  $\text{HNO}_3$  (р) +  $\text{Ag} \rightarrow$   
 71.  $\text{HNO}_3$  (к) +  $\text{Cu} \rightarrow$   
 72.  $\text{HNO}_3$  (к) +  $\text{Sn} \rightarrow$   
 73.  $\text{HNO}_3$  (к) +  $\text{Bi} \rightarrow$   
 74.  $\text{HNO}_3$  (к) +  $\text{Sb} \rightarrow$   
 75.  $\text{HNO}_3$  (р) +  $\text{Sn} \rightarrow$   
 76.  $\text{HNO}_3$  (к) +  $\text{P} \rightarrow$   
 77.  $\text{HNO}_3$  (к) +  $\text{Cu}_2\text{S} \rightarrow$   
 78.  $\text{HNO}_3$  (к) +  $\text{Sb}_2\text{S}_3 \rightarrow$   
 79.  $\text{HNO}_3$  (к) +  $\text{AsH}_3 \rightarrow$   
 80.  $\text{HNO}_3$  (к) +  $\text{Cu}_2\text{O} \rightarrow$   
 81.  $\text{HNO}_3 + \text{BaO} \rightarrow$   
 82.  $\text{HNO}_3$  (к) +  $\text{Fe}(\text{OH})_2 \rightarrow$   
 83.  $\text{HNO}_3 + \text{Fe}(\text{OH})_3 \rightarrow$   
 84.  $\text{HNO}_3 + \text{Na}_2\text{SO}_3 \rightarrow$   
 85.  $\text{HNO}_3 + \text{CH}_3\text{COONa} \rightarrow$   
 86.  $\text{NaNO}_3$  (т)  $\rightarrow$   
 87.  $\text{Pb}(\text{NO}_3)_2$  (т)  $\rightarrow$   
 88.  $\text{AgNO}_3$  (т)  $\rightarrow$   
 89.  $\text{NaNO}_3 + \text{Zn} + \text{NaOH} \rightarrow$   
 90.  $\text{KNO}_3 + \text{C} + \text{S} \rightarrow$   
 91.  $\text{HNO}_3 + \text{HCl} \rightarrow$   
 92.  $\text{HNO}_3 + \text{HCl} + \text{Au} \rightarrow$   
 93.  $\text{N}_2\text{H}_4 + \text{K}_2\text{S}_2\text{O}_8 + \text{KOH} \rightarrow$   
 94.  $\text{NaNH}_3$  (т)  $\rightarrow$   
 95.  $\text{NaNH}_2 + \text{N}_2\text{O} \rightarrow$   
 96. (Пры электролізе)  $\text{HNO}_3 + \text{H}$  (ат.)  $\rightarrow$   
 97.  $\text{NH}_3 + \text{Ca}(\text{OCl})_2 \rightarrow$   
 98.  $\text{Ca}_3(\text{PO}_4)_2 + \text{C} + \text{SiO}_2 \rightarrow$   
 99.  $\text{Ca}_3(\text{PO}_4)_2 + \text{C} \rightarrow$   
 100.  $\text{P} + \text{O}_2$  (нед.)  $\rightarrow$   
 101.  $\text{P} + \text{O}_2$  (лішак)  $\rightarrow$   
 102.  $\text{P} + \text{Cl}_2 + \text{PCl}_3 \rightarrow$   
 103.  $\text{P} + \text{S} \rightarrow$   
 104.  $\text{P} + \text{Na} \rightarrow$   
 105.  $\text{P} + \text{Ba}(\text{OH})_2 + \text{H}_2\text{O} \rightarrow$   
 106.  $\text{PI}_3 + \text{H}_2\text{O} \rightarrow$   
 107.  $\text{PCl}_3 + \text{H}_2\text{O} \rightarrow$   
 108.  $\text{POCl}_3 + \text{H}_2\text{O} \rightarrow$   
 109.  $\text{POCl}_3 + \text{KOH} \rightarrow$   
 110.  $\text{PF}_5 + \text{HF} \rightarrow$   
 111.  $\text{P}_2\text{O}_5 + \text{PCl}_3 \rightarrow$   
 112.  $\text{Mg}_3\text{P}_2 + \text{H}_2\text{O} \rightarrow$   
 113.  $\text{AlP} + \text{HCl} \rightarrow$   
 114.  $\text{PH}_3 + \text{HI} \rightarrow$   
 115.  $\text{Na}_2\text{S} + \text{As}_2\text{S}_3 \rightarrow$   
 116.  $\text{P}_2\text{O}_3 + \text{H}_2\text{O} \rightarrow$   
 117.  $\text{P}_2\text{O}_3 + \text{NaOH} \rightarrow$   
 118.  $\text{H}_3\text{PO}_2$  (т)  $\rightarrow$   
 119.  $\text{H}_3\text{PO}_2 + \text{NaOH} \rightarrow$   
 120.  $\text{NaH}_2\text{PO}_2 + \text{H}_2\text{O} \rightarrow$   
 121.  $\text{NaH}_2\text{PO}_2 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow$   
 122.  $\text{H}_3\text{PO}_3$  (т)  $\rightarrow$   
 123.  $\text{H}_3\text{PO}_3 + \text{Ba}(\text{OH})_2 \rightarrow$   
 124.  $\text{P}_4\text{O}_{10} + \text{H}_2\text{O} \rightarrow$   
 125.  $(\text{HPO}_3)_n + \text{H}_2\text{O}$  (т)  $\rightarrow$   
 126.  $\text{H}_5\text{P}_3\text{O}_{10} + \text{NaOH} \rightarrow$

127.  $\text{H}_4\text{P}_2\text{O}_7 + \text{H}_2\text{O} \rightarrow$   
 128.  $(\text{HPO}_3)_4 + \text{H}_2\text{O} \rightarrow$   
 129.  $\text{CaO} + \text{P}_2\text{O}_5 \rightarrow$   
 130.  $\text{Ca}_3(\text{PO}_4)_2 + \text{H}_2\text{SO}_4 \rightarrow$   
 131.  $\text{Ca}_3(\text{PO}_4)_2 + \text{H}_3\text{PO}_4 \rightarrow$   
 132.  $\text{Ca}(\text{H}_2\text{PO}_4)_2 (\text{t}) \rightarrow$   
 133.  $\text{H}_3\text{PO}_4 (\text{t}) \rightarrow$   
 134.  $\text{As}_2\text{S}_3 + \text{O}_2 \rightarrow$   
 135.  $\text{Sb}_2\text{O}_3 + \text{C} \rightarrow$   
 136.  $\text{As}_2\text{S}_3 + \text{Zn} + \text{HCl} \rightarrow$   
 137.  $\text{BiCl}_3 + \text{Cl}_2 + \text{KOH} \rightarrow$   
 138.  $\text{NaBiO}_3 + \text{H}_2\text{O}_2 + \text{H}_2\text{SO}_4 \rightarrow$   
 139.  $\text{Bi}(\text{NO}_3)_2 + \text{H}_2\text{O} (\text{t}) \rightarrow$   
 140.  $\text{Na}_3\text{PO}_4 + \text{H}_2\text{O} \rightarrow$   
 141.  $\text{As}_2\text{O}_3 + \text{HNO}_3 + \text{H}_2\text{O} \rightarrow$   
 142.  $\text{As}_2\text{O}_3 + \text{KOH} + \text{H}_2\text{O} \rightarrow$   
 143.  $\text{P}_2\text{S}_5 + \text{H}_2\text{O} \rightarrow$   
 144.  $\text{CaHPO}_4 (\text{t}) \rightarrow$   
 145.  $\text{NaNO}_2 + \text{Al} + \text{H}_2\text{SO}_4 \rightarrow$

### VI група, р-элементы

1.  $\text{O}_2 + \text{Fe} \rightarrow$   
 2.  $\text{O}_2 + \text{Na} \rightarrow$   
 3.  $\text{O}_2 + \text{K} \rightarrow$   
 4.  $\text{O}_2 + \text{S} \rightarrow$   
 5.  $\text{O}_2 + \text{N}_2 \rightarrow$   
 6.  $\text{O}_3 + \text{K} \rightarrow$   
 7.  $\text{O}_3 + \text{Ag} \rightarrow$   
 8.  $\text{O}_2 + \text{H}_2\text{S} \rightarrow$   
 9.  $\text{O}_2 + \text{H}_2\text{S} (\text{лішак}) \rightarrow$   
 10.  $\text{O}_2 + \text{NH}_3 \rightarrow$   
 11.  $\text{O}_2 + \text{NH}_3 (\text{Pt}) \rightarrow$   
 12.  $\text{O}_2 + \text{Ag} + \text{H}_2\text{S} \rightarrow$   
 13.  $\text{O}_3 + \text{NO}_2 \rightarrow$   
 14.  $\text{O}_3 + \text{ClO}_2 \rightarrow$   
 15.  $\text{O}_2 + \text{BaO} \rightarrow$   
 16.  $\text{O}_2 + \text{FeS}_2 \rightarrow$   
 17.  $\text{CaS}_2 + \text{HNO}_3 (\text{к.}) \rightarrow$   
 18.  $\text{O}_2 + \text{SO}_2 \rightarrow$   
 19.  $\text{O}_2 + \text{Cu}_2\text{O} \rightarrow$   
 20.  $\text{O}_2 + \text{NO} \rightarrow$   
 21.  $\text{S} + \text{F}_2 \rightarrow$   
 22.  $\text{S} + \text{Cl}_2 \rightarrow$   
 23.  $\text{S} + \text{H}_2 \rightarrow$   
 24.  $\text{S} + \text{Fe} \rightarrow$   
 25.  $\text{S} + \text{H}_2\text{S} \rightarrow$   
 26.  $\text{S} + \text{H}_2\text{SO}_4 (\text{к.}) \rightarrow$   
 27.  $\text{S} + \text{NaOH} (\text{t}) \rightarrow$   
 28.  $\text{S} + \text{Na}_2\text{SO}_3 (\text{t}) \rightarrow$   
 29.  $\text{S} + \text{FeS} \rightarrow$   
 30.  $\text{S} + \text{HNO}_3 (\text{к.}) \rightarrow$   
 31.  $\text{H}_2\text{O}_2 \rightarrow$   
 32.  $\text{H}_2\text{O}_2 + \text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow$   
 33.  $\text{H}_2\text{O}_2 + \text{KI} + \text{H}_2\text{SO}_4 \rightarrow$   
 34.  $\text{Na}_2\text{O}_2 + \text{H}_2\text{O} \rightarrow$   
 35.  $\text{BaO}_2 + \text{H}_2\text{SO}_4 \rightarrow$   
 36.  $\text{H}_2\text{SO}_3 + \text{H}_2\text{O} \rightarrow$   
 37.  $\text{BaO}_2 + \text{CO}_2 \rightarrow$   
 38.  $\text{BaO}_2 + \text{SO}_3 \rightarrow$   
 39.  $\text{K}_2\text{Cr}_2\text{O}_7 (\text{t}) \rightarrow$   
 40.  $\text{KNO}_3 (\text{t}) \rightarrow$   
 41.  $\text{KMnO}_4 (\text{t}) \rightarrow$   
 42.  $\text{CaO} + \text{P}_2\text{O}_5 \rightarrow$   
 43.  $\text{CaO} + \text{Al}_2\text{O}_3 \rightarrow$   
 44.  $\text{Al}_2\text{O}_3 + \text{P}_2\text{O}_5 \rightarrow$   
 45.  $\text{BaSO}_4 + \text{C} (\text{t}) \rightarrow$   
 46.  $\text{Na}_2\text{S} + \text{CS}_2 \rightarrow$   
 47.  $\text{Al}_2\text{S}_3 + \text{P}_2\text{S}_5 \rightarrow$   
 48.  $\text{Na}_2\text{S} + \text{H}_2\text{O} \rightarrow$

49.  $\text{Al}_2\text{S}_3 + \text{H}_2\text{O} \rightarrow$   
 50.  $\text{SiS}_2 + \text{H}_2\text{O} \rightarrow$   
 51.  $\text{SF}_4 + \text{H}_2\text{O} \rightarrow$   
 52.  $\text{SO}_2\text{Cl}_2 + \text{H}_2\text{O} \rightarrow$   
 53.  $\text{SO}_2 + \text{Cl}_2 \rightarrow$   
 54.  $\text{FeS} + \text{HCl} \rightarrow$   
 55.  $\text{Na}_2\text{S}_3 + \text{HCl} \rightarrow$   
 56.  $\text{Na}_2\text{SO}_3 + \text{HCl} \rightarrow$   
 57.  $\text{SO}_2 + \text{NaOH} \rightarrow$   
 58.  $\text{SO}_2 + \text{NaOH}$  (лішак)  $\rightarrow$   
 59.  $\text{Na}_2\text{SO}_3$  (т)  $\rightarrow$   
 60.  $\text{SO}_2 + \text{NO}_2 \rightarrow$   
 61.  $\text{CrCl}_3 + \text{H}_2\text{O}_2 + \text{NaOH} \rightarrow$   
 62.  $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow$   
 63.  $\text{Zn} + \text{H}_2\text{SO}_4$  (к.)  $\rightarrow$   
 64.  $\text{Mg} + \text{H}_2\text{SO}_4$  (к.)  $\rightarrow$   
 65.  $\text{Cu} + \text{H}_2\text{SO}_4$  (к.)  $\rightarrow$   
 66.  $\text{C}_2\text{H}_5\text{OH} + \text{H}_2\text{SO}_4$  (к.)  $\rightarrow$   
 67.  $\text{P} + \text{H}_2\text{SO}_4$  (к.)  $\rightarrow$   
 68.  $\text{H}_2\text{SO}_4$  (електроліз)  $\rightarrow$   
 69.  $\text{CuSO}_4 + \text{H}_2\text{O} \rightarrow$   
 70.  $\text{Na}_2\text{SO}_3 + \text{H}_2\text{O} \rightarrow$   
 71.  $\text{H}_2\text{S}_2\text{O}_3 \rightarrow$   
 72.  $\text{H}_2\text{SO}_4 + \text{SO}_3 \rightarrow$   
 73.  $\text{H}_2\text{S}_2\text{O}_8 + \text{H}_2\text{O} \rightarrow$   
 74.  $\text{Na}_2\text{S} + \text{KMnO}_4 + \text{H}_2\text{O} \rightarrow$   
 75.  $\text{H}_2\text{SO}_3 + \text{H}_2\text{O}_2 \rightarrow$   
 76.  $\text{Na}_2\text{S}_2\text{O}_3 + \text{AgCl} \rightarrow$   
 77.  $\text{KHSO}_4$  (т)  $\rightarrow$   
 78.  $\text{Na}_2\text{S}_2\text{O}_3 + \text{HCl} \rightarrow$   
 79.  $\text{Hg}(\text{NO}_3)_2 + \text{H}_2\text{S} \rightarrow$   
 80.  $\text{KNO}_3 + \text{S} + \text{C} \rightarrow$   
 81.  $\text{Na}_2\text{S}_2\text{O}_3 + \text{Cl}_2 + \text{H}_2\text{O} \rightarrow$   
 82.  $\text{Na}_2\text{S}_2\text{O}_3 + \text{I}_2 \rightarrow$   
 83.  $\text{SO}_2 + \text{H}_2\text{S} \rightarrow$   
 84.  $\text{Se} + \text{KOH} \rightarrow$   
 85.  $\text{Na}_2\text{Se} + \text{H}_2\text{O} \rightarrow$   
 86.  $\text{Au} + \text{H}_2\text{SeO}_4$  (к.)  $\rightarrow$   
 87.  $\text{H}_2\text{SeO}_4 + \text{HCl} \rightarrow$   
 88.  $\text{H}_6\text{TeO}_6 \rightarrow$   
 89.  $\text{Cd}(\text{NO}_3)_2 + \text{H}_2\text{S} \rightarrow$   
 90.  $\text{Cu}_2\text{S} + \text{HNO}_3 \rightarrow$   
 91.  $\text{H}_2\text{S}_3\text{O}_{10} + \text{H}_2\text{O} \rightarrow$   
 92.  $\text{Na}_2\text{SO}_3 + \text{CuSO}_4 \rightarrow$   
 93.  $\text{Se} + \text{HNO}_3 \rightarrow$   
 94.  $\text{FeSO}_4$  (т)  $\rightarrow$   
 95.  $\text{Fe}_2(\text{SO}_4)_3$  (т)  $\rightarrow$   
 96.  $\text{SnO}_2 + \text{H}_2\text{SO}_4 \rightarrow$   
 97.  $\text{AlCl}_3 + \text{Na}_2\text{S} + \text{H}_2\text{O} \rightarrow$   
 98.  $\text{KClO}_3 + \text{S} \rightarrow$   
 99.  $\text{H}_2\text{O}_2 + \text{Ca}(\text{ClO})_2 \rightarrow$

## VII група, p-елементи

1.  $\text{NaF}$  (електроліз)  $\rightarrow$   
 2.  $\text{F}_2 + \text{H}_2\text{O} \rightarrow$   
 3.  $\text{F}_2 + \text{Cl}_2 \rightarrow$   
 4.  $\text{Fe} + \text{F}_2 \rightarrow$   
 5.  $\text{NaOH} + \text{F}_2$  (хал.)  $\rightarrow$   
 6.  $\text{F}_2 + \text{ClF} \rightarrow$   
 7.  $\text{S} + \text{F}_2 \rightarrow$   
 8.  $\text{Si} + \text{F}_2 \rightarrow$   
 9.  $\text{Xe} + \text{F}_2 \rightarrow$   
 10.  $\text{F}_2 + \text{SiO}_2 \rightarrow$   
 11.  $\text{F}_2 + \text{NaClO}_3 + \text{NaOH} \rightarrow$   
 12.  $\text{HF}$  (к) +  $\text{NaOH} \rightarrow$   
 13.  $\text{HF} + \text{SiO}_2 \rightarrow$   
 14.  $\text{NaF} + \text{SiF}_4 \rightarrow$   
 15.  $\text{NaF} + \text{BeF}_2 \rightarrow$   
 16.  $\text{BeF}_2 + \text{SiF}_4 \rightarrow$   
 17.  $\text{NaF} + \text{H}_2\text{O} \rightarrow$   
 18.  $\text{SiF}_4 + \text{H}_2\text{O} \rightarrow$   
 19.  $\text{KHF}_2$  (т)  $\rightarrow$   
 20.  $\text{CaF}_2 + \text{H}_2\text{SO}_4 \rightarrow$   
 21.  $\text{NaCl} + \text{H}_2\text{O}$  (електроліз)  $\rightarrow$   
 22.  $\text{Cl}_2 + \text{H}_2\text{O} \rightarrow$

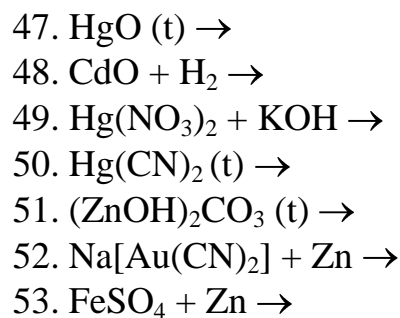
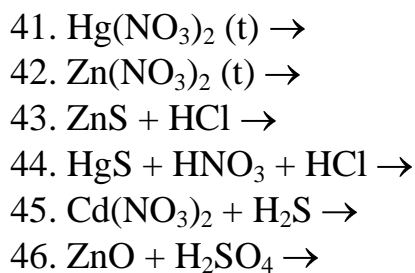
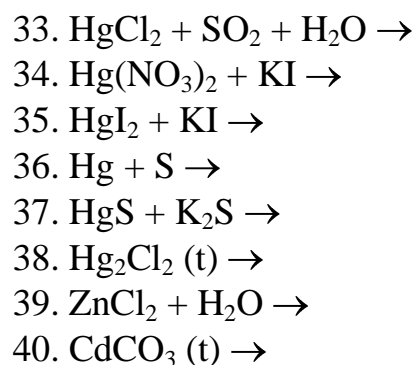
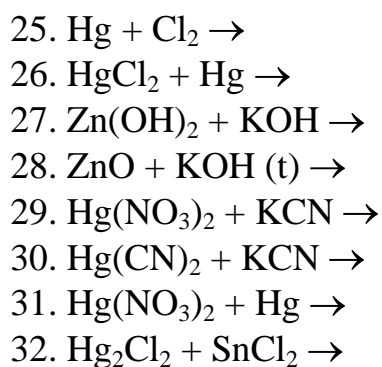
23.  $\text{Cl}_2 + \text{P} \rightarrow$   
 24.  $\text{Cl}_2 + \text{S} \rightarrow$   
 25.  $\text{NaOH (хал.)} + \text{Cl}_2 \rightarrow$   
 26.  $\text{NaOH} + \text{Cl}_2 (\text{т}) \rightarrow$   
 27.  $\text{Ca(OH)}_2 + \text{Cl}_2 \rightarrow$   
 28.  $\text{KMnO}_4 + \text{HCl} \rightarrow$   
 29.  $\text{MnO}_2 + \text{HCl} \rightarrow$   
 30.  $\text{K}_2\text{Cr}_2\text{O}_7 + \text{HCl (к.)} \rightarrow$   
 31.  $\text{PbO}_2 + \text{HCl} \rightarrow$
32.  $\text{NaCl} + \text{Cl}_2 \rightarrow$   
 33.  $\text{HCl} + \text{Ba(OH)}_2 \rightarrow$   
 34.  $\text{Ca(ClO)}_2 + \text{HCl} \rightarrow$   
 35.  $\text{Cl}_2 + \text{H}_2\text{O} \rightarrow$   
 36.  $\text{HCl} + \text{Zn} \rightarrow$   
 37.  $\text{HCl} + \text{KClO}_3 \rightarrow$   
 38.  $\text{NaCl (кр.)} + \text{H}_2\text{SO}_4 (\text{к.}) \rightarrow$   
 39.  $\text{PCl}_3 + \text{H}_2\text{O} \rightarrow$   
 40.  $\text{AlCl}_3 + \text{H}_2\text{O} \rightarrow$
41.  $\text{ClF} + \text{H}_2\text{O} \rightarrow$   
 42.  $\text{ClF}_3 + \text{H}_2\text{O} \rightarrow$   
 43.  $\text{HCl} + \text{F}_2 \rightarrow$   
 44.  $\text{Cl}_2 + \text{Na}_2\text{SO}_3 + \text{H}_2\text{O} \rightarrow$   
 45.  $\text{Cl}_2\text{O} + \text{H}_2\text{O} \rightarrow$   
 46.  $\text{Cl}_2\text{O} + \text{Ba(OH)}_2 \rightarrow$   
 47.  $\text{ClO}_2 + \text{H}_2\text{O} \rightarrow$   
 48.  $\text{ClO}_3 + \text{NaOH} \rightarrow$   
 49.  $\text{ClO}_2 + \text{HI} \rightarrow$   
 50.  $\text{ClO}_3 + \text{H}_2\text{O} \rightarrow$   
 51.  $\text{ClO}_3 + \text{NaOH} \rightarrow$   
 52.  $\text{Cl}_2\text{O}_7 + \text{Ba(OH)}_2 \rightarrow$   
 53.  $\text{HClO}_4 + \text{P}_2\text{O}_5 \rightarrow$   
 54.  $\text{HClO} + \text{P}_2\text{O}_5 \rightarrow$   
 55.  $\text{HClO (цвет)} \rightarrow$   
 56.  $\text{HClO (т)} \rightarrow$   
 57.  $\text{HClO} + \text{NaOH} \rightarrow$   
 58.  $\text{HClO} + \text{HI} \rightarrow$   
 59.  $\text{Ca(ClO)}_2 + \text{CO}_2 + \text{H}_2\text{O} \rightarrow$   
 60.  $\text{Ca(ClO)}_2 + \text{CO}_2 \rightarrow$
61.  $\text{NaClO} + \text{H}_2\text{O}_2 + \text{H}_2\text{SO}_4 \rightarrow$   
 62.  $\text{KClO (т)} \rightarrow$   
 63.  $\text{KClO}_2 (\text{т}) \rightarrow$   
 64.  $\text{KClO}_3 (\text{т}) \rightarrow$   
 65.  $\text{KClO}_3 (\text{т, MnO}_2) \rightarrow$   
 66.  $\text{KClO}_4 (\text{т}) \rightarrow$   
 67.  $\text{HClO}_2 \rightarrow$   
 68.  $\text{HClO}_2 + \text{HCl} \rightarrow$   
 69.  $\text{HClO}_2 + \text{NaOH} \rightarrow$   
 70.  $\text{NaClO}_2 + \text{H}_2\text{O} \rightarrow$   
 71.  $\text{Ba(ClO}_2)_2 + \text{H}_2\text{SO}_4 \rightarrow$   
 72.  $\text{HClO}_3 + \text{NaOH} \rightarrow$   
 73.  $\text{FeSO}_4 + \text{HClO}_3 + \text{H}_2\text{SO}_4 \rightarrow$   
 74.  $\text{NaClO} + \text{KI} + \text{H}_2\text{SO}_4 \rightarrow$   
 75.  $\text{NaF (кр.)} + \text{H}_2\text{SO}_4 (\text{к.}) \rightarrow$   
 76.  $\text{NaClO}_3 + \text{SO}_2 + \text{H}_2\text{O} \rightarrow$   
 77.  $\text{Cl}_2 + \text{Br}_2 + \text{NaOH} \rightarrow$   
 78.  $\text{Cl}_2 + \text{I}_2 + \text{KOH} \rightarrow$   
 79.  $\text{Br}_2 + \text{I}_2 + \text{Ba(OH)}_2 \rightarrow$   
 80.  $\text{I}_2 + \text{HNO}_3 \rightarrow$
81.  $\text{KI} + \text{K}_3[\text{Fe(CN)}_6] \rightarrow$   
 82.  $\text{KIO}_4 + \text{KI} \rightarrow$   
 83.  $\text{NaCrO}_2 + \text{Br}_2 + \text{NaOH} \rightarrow$   
 84.  $\text{KBr} + \text{KBrO}_3 + \text{H}_2\text{SO}_4 \rightarrow$   
 85.  $\text{Ba}_5(\text{IO}_6)_2 + \text{H}_2\text{SO}_4 \rightarrow$   
 86.  $\text{KI} + \text{HgI}_2 \rightarrow$
87.  $\text{I}_2\text{O}_7 + \text{NaOH} \rightarrow$   
 88.  $\text{NaCl} + \text{AgNO}_3 \rightarrow$   
 89.  $\text{NaBr} + \text{AgNO}_3 \rightarrow$   
 90.  $\text{NaI} + \text{AgNO}_3 \rightarrow$   
 91.  $\text{IF}_5 + \text{KOH} \rightarrow$   
 92.  $\text{KI} + \text{I}_2 \rightarrow$

### I група, d-элементы

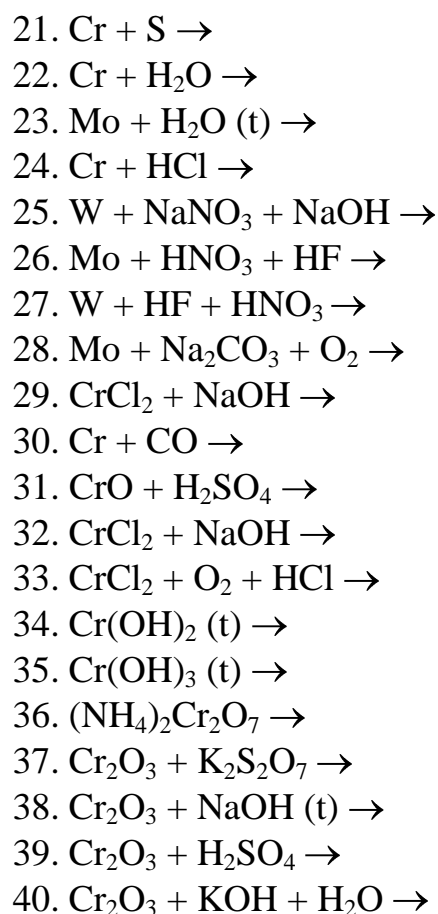
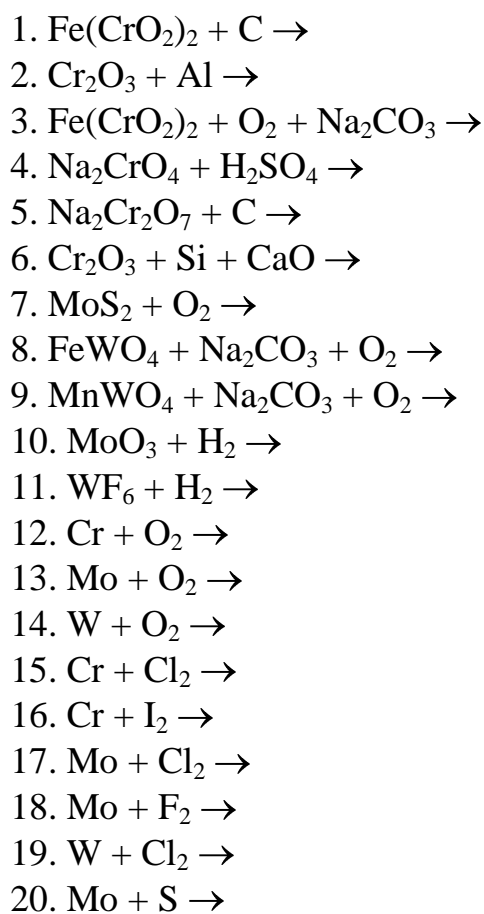
1.  $\text{CuFeS}_2 + \text{O}_2 + \text{SiO}_2 \rightarrow$
2.  $\text{Cu}_2\text{S} + \text{Fe}_2(\text{SO}_4)_3 \rightarrow$
3.  $\text{CuSO}_4 + \text{Fe} \rightarrow$
4.  $\text{Ag} + \text{NaCN} + \text{O}_2 + \text{H}_2\text{O} \rightarrow$
5.  $\text{Na}[\text{Ag}(\text{CN})_2] + \text{Zn} \rightarrow$
6.  $\text{CuO} + \text{H}_2 \rightarrow$
7.  $\text{CuO} + \text{CO} \rightarrow$
8.  $\text{CuO} + \text{NH}_3 (\text{т}) \rightarrow$
9.  $\text{Cu}_2\text{O} + \text{Cu}_2\text{S} \rightarrow$
10.  $\text{Au} + \text{HCl} + \text{HNO}_3 \rightarrow$
11.  $\text{Cu} + \text{O}_2 + \text{NH}_3 + \text{H}_2\text{O} \rightarrow$
12.  $\text{Ag} + \text{O}_3 \rightarrow$
13.  $\text{Ag} + \text{O}_2 + \text{H}_2\text{S} \rightarrow$
14.  $\text{Cu} + \text{H}_2\text{SO}_4 (\text{к.}) \rightarrow$
15.  $\text{Cu} + \text{HNO}_3 (\text{к.}) \rightarrow$
16.  $\text{Ag} + \text{HNO}_3 (\text{к.}) \rightarrow$
17.  $\text{Cu} + \text{Cl}_2 \rightarrow$
18.  $\text{Cu} + \text{KCN} + \text{H}_2\text{O} \rightarrow$
19.  $\text{Au} + \text{I}_2 (\text{т}) \rightarrow$
20.  $\text{Ag} + \text{F}_2 (\text{т}) \rightarrow$
21.  $\text{Au} + \text{Cl}_2 (\text{т}) \rightarrow$
22.  $\text{Au} + \text{Cl}_2 + \text{HCl} \rightarrow$
23.  $\text{CuSO}_4 + \text{KI} \rightarrow$
24.  $\text{CuF}_2 + \text{KF} \rightarrow$
25.  $\text{CuCl}_2 + \text{NH}_3 \rightarrow$
26.  $\text{AgCl} + \text{NH}_3 \rightarrow$
27.  $\text{AgI} + \text{Na}_2\text{S}_2\text{O}_3 \rightarrow$
28.  $\text{AuCl}_3 (\text{т}) \rightarrow$
29.  $\text{AgBr} (\text{т}) \rightarrow$
30.  $\text{CuO} + \text{NH}_3 + \text{H}_2\text{O} \rightarrow$
31.  $(\text{CuOH})_2\text{CO}_3 (\text{т}) \rightarrow$
32.  $\text{Cu}(\text{NO}_3)_2 (\text{т}) \rightarrow$
33.  $\text{AgNO}_3 (\text{т}) \rightarrow$
34.  $\text{AgCN} (\text{т}) \rightarrow$
35.  $\text{AgNO}_3 + \text{KOH} \rightarrow$
36.  $\text{Ag}_2\text{O} + \text{NH}_3 + \text{H}_2\text{O} \rightarrow$
37.  $\text{Cu}(\text{OH})_2 (\text{т}) \rightarrow$
38.  $\text{CuSO}_4 + \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} \rightarrow$
39.  $\text{Ag}_2\text{O} + \text{HCl} \rightarrow$
40.  $\text{CuS} + \text{HNO}_3 \rightarrow$
41.  $\text{Ag}_2\text{S} + \text{Na}_2\text{S} \rightarrow$
42.  $\text{CuS} + \text{O}_2 \rightarrow$
43.  $\text{CuSO}_4 + \text{KCN} \rightarrow$
44.  $\text{CuCl} \rightarrow$
45.  $\text{AgI} + \text{KI} \rightarrow$

### II група, d-элементы

1.  $\text{ZnS} + \text{O}_2 \rightarrow$
2.  $\text{ZnO} + \text{C} \rightarrow$
3.  $\text{ZnO} + \text{H}_2\text{SO}_4 \rightarrow$
4.  $\text{ZnSO}_4 + \text{H}_2\text{O} (\text{электролиз}) \rightarrow$
5.  $\text{HgS} + \text{O}_2 \rightarrow$
6.  $\text{CdSO}_4 + \text{Zn} \rightarrow$
7.  $\text{Zn} + \text{S} \rightarrow$
8.  $\text{Hg} + \text{O}_2 \rightarrow$
9.  $\text{Cd} + \text{Cl}_2 \rightarrow$
10.  $\text{Cd} + \text{H}_2\text{SO}_4 (\text{р.}) \rightarrow$
11.  $\text{Hg} + \text{H}_2\text{SO}_4 (\text{к.}) \rightarrow$
12.  $\text{Zn} + \text{NaOH} + \text{H}_2\text{O} (\text{т}) \rightarrow$
13.  $\text{Zn} + \text{HCl} \rightarrow$
14.  $\text{Zn} + \text{H}_2\text{SO}_4 (\text{к.}) \rightarrow$
15.  $\text{Zn} + \text{HNO}_3 (\text{р.}) \rightarrow$
16.  $\text{Hg} + \text{H}_2\text{SO}_4 (\text{к., т}) \rightarrow$
17.  $\text{Hg} + \text{HNO}_3 (\text{р.}) \rightarrow$
18.  $\text{Hg} (\text{лішак}) + \text{HNO}_3 (\text{р.}) \rightarrow$
19.  $\text{Hg} + \text{HCl} + \text{HNO}_3 (\text{т}) \rightarrow$
20.  $\text{Hg} + \text{HNO}_3 (\text{к.}) \rightarrow$
21.  $\text{ZnSO}_4 + \text{NH}_3 \rightarrow$
22.  $\text{CdSO}_4 + \text{KOH} \rightarrow$
23.  $\text{Hg}(\text{NO}_3)_2 + \text{KOH} \rightarrow$
24.  $\text{HgO} + \text{Cl}_2 \rightarrow$



### VI группа, d-элементы



43.  $\text{MoO} (t) \rightarrow$   
 44.  $\text{CrO}_3 (t) \rightarrow$   
 45.  $\text{CrO}_3 + \text{H}_2\text{O} \rightarrow$   
 46.  $\text{CrO}_3 + \text{NaOH} \rightarrow$   
 47.  $\text{K}_2\text{CrO}_4 + \text{HCl} (p.) \rightarrow$   
 48.  $\text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4 (к.) \rightarrow$   
 49.  $\text{K}_2\text{Cr}_2\text{O}_7 + \text{KOH} \rightarrow$   
 50.  $\text{K}_2\text{Cr}_2\text{O}_7 (t) \rightarrow$   
 51.  $\text{K}_2\text{Cr}_2\text{O}_7 + \text{HCl} (к.) \rightarrow$   
 52.  $\text{K}_2\text{Cr}_2\text{O}_7 + \text{FeSO}_4 + \text{H}_2\text{SO}_4 \rightarrow$   
 53.  $\text{K}_2\text{Cr}_2\text{O}_7 + \text{Na}_2\text{SO}_3 + \text{H}_2\text{SO}_4 \rightarrow$   
 54.  $\text{KCrO}_2 + \text{Cl}_2 + \text{KOH} \rightarrow$   
 55.  $\text{K}_2\text{CrO}_4 + (\text{NH}_4)_2\text{S} + \text{H}_2\text{O} \rightarrow$   
 56.  $\text{Na}_2\text{MoO}_4 + \text{H}_2\text{SO}_4 \rightarrow$   
 57.  $\text{MoCl}_6 + \text{H}_2\text{O} \rightarrow$   
 58.  $\text{Cr}_2(\text{SO}_4)_3 + \text{H}_2\text{O} \rightarrow$   
 59.  $\text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{O}_2 + \text{H}_2\text{SO}_4 (y \text{ эфирьы}) \rightarrow$   
 60.  $\text{Cr}_2\text{S}_3 + \text{H}_2\text{O} \rightarrow$   
 61.  $\text{Cr}(\text{CO})_6 (t) \rightarrow$   
 62.  $(\text{NH}_4)_2\text{WO}_4 \rightarrow$   
 63.  $\text{WO}_3 + \text{CaO} \rightarrow$   
 64.  $\text{Cr}(\text{OH})_3 + \text{NaOH} \rightarrow$   
 65.  $\text{CrO}_3 + \text{HCl} \rightarrow$   
 66.  $\text{H}_2\text{MoO}_4 + \text{MoO}_3 \rightarrow$   
 67.  $\text{CrCl}_3 + \text{H}_2\text{O} \rightarrow$   
 68.  $\text{KCrO}_2 + \text{NaClO} + \text{KOH} \rightarrow$   
 69.  $\text{CrBr}_3 + \text{H}_2\text{O}_2 + \text{NaOH} \rightarrow$   
 70.  $\text{MoS}_2 + \text{HNO}_3 \rightarrow$   
 71.  $\text{Na}_2\text{Cr}_2\text{O}_7 + \text{KI} + \text{H}_2\text{SO}_4 \rightarrow$   
 72.  $\text{KF} + \text{MoF}_6 \rightarrow$   
 73.  $\text{CrCl}_3 + \text{NH}_3 \rightarrow$   
 74.  $\text{KF} + \text{WF}_6 \rightarrow$   
 75.  $\text{KCl} + \text{CrCl}_3 \rightarrow$   
 76.  $\text{Na}_2\text{Cr}_2\text{O}_7 + \text{CrO}_3 \rightarrow$

### VII группа, d-элементы

1.  $\text{MoO}_2 + \text{C} \rightarrow$   
 2.  $\text{Mo}_3\text{O}_4 + \text{Al} \rightarrow$   
 3.  $\text{MnO}_2 + \text{Si} \rightarrow$   
 4.  $\text{NH}_4\text{ReO}_4 + \text{H}_2 \rightarrow$   
 5.  $\text{KReO}_4 + \text{H}_2 \rightarrow$   
 6.  $\text{Mn} + \text{O}_2 \rightarrow$   
 7.  $\text{Re} + \text{O}_2 \rightarrow$   
 8.  $\text{Mn} + \text{F}_2 \rightarrow$   
 9.  $\text{Re} + \text{F}_2 \rightarrow$   
 10.  $\text{Mn} + \text{S} \rightarrow$   
 11.  $\text{Mn} + \text{H}_2\text{O} (t) \rightarrow$   
 12.  $\text{Mn} + \text{HCl} \rightarrow$   
 13.  $\text{Mn} + \text{HNO}_3 (к.) \rightarrow$   
 14.  $\text{Re} + \text{HNO}_3 (p.) \rightarrow$   
 15.  $\text{Mn} + \text{CO} (t, p.) \rightarrow$   
 16.  $\text{Mn}_2(\text{CO})_{10} (t) \rightarrow$   
 17.  $\text{MnCO}_3 (t) \rightarrow$   
 18.  $\text{Mn}(\text{OH})_2 (t) \rightarrow$   
 19.  $\text{MnO} + \text{HCl} \rightarrow$   
 20.  $\text{MnSO}_4 + \text{KOH} \rightarrow$   
 21.  $\text{MnCO}_3 + \text{HNO}_3 \rightarrow$   
 22.  $\text{Mn}(\text{OH})_2 + \text{O}_2 + \text{H}_2\text{O} \rightarrow$   
 23.  $\text{MnF}_2 + \text{KF} \rightarrow$   
 24.  $\text{MnCl}_2 + \text{KCl} \rightarrow$   
 25.  $\text{Mn}(\text{CN})_2 + \text{KCN} \rightarrow$   
 26.  $\text{MnSO}_4 + \text{PbO}_2 + \text{HNO}_3 \rightarrow$   
 27.  $\text{MnO}_2 (t) \rightarrow$   
 28.  $\text{Mn}_3\text{O}_4 + \text{HCl} (к.) \rightarrow$   
 29.  $\text{Mn}_3\text{O}_4 + \text{HNO}_3 \rightarrow$   
 30.  $\text{MnO}_2 + \text{KOH} \rightarrow$   
 31.  $\text{ReO}_2 + \text{NaOH} \rightarrow$   
 32.  $\text{MnO}_2 + \text{H}_2\text{SO}_4 (к.) \rightarrow$   
 33.  $\text{MnO}_2 + \text{HCl} (к.) \rightarrow$   
 34.  $\text{MnO}_2 + \text{KOH} + \text{O}_2 \rightarrow$   
 35.  $\text{MnO}_2 + \text{KOH} + \text{KNO}_3 \rightarrow$   
 36.  $\text{Mn}(\text{NO}_3)_2 (t) \rightarrow$   
 37.  $\text{K}_2\text{MnO}_4 + \text{Cl}_2 \rightarrow$   
 38.  $\text{Mn}(\text{NO}_3)_2 + (\text{NH}_4)_2\text{S}_2\text{O}_8 + \text{H}_2\text{O} \rightarrow$   
 39.  $\text{KMnO}_4 (t) \rightarrow$   
 40.  $\text{KF} + \text{ReF}_6 \rightarrow$



41.  $\text{KMnO}_4 + \text{H}_2\text{SO}_4 \rightarrow$   
 42.  $\text{Mn}_2\text{O}_7 \rightarrow$   
 43.  $\text{Re}_2\text{O}_7 + \text{H}_2\text{O} \rightarrow$   
 44.  $\text{ReO}_2 + \text{NaOH (t)} \rightarrow$   
 45.  $\text{NH}_4\text{ReO}_4 \text{ (t)} \rightarrow$   
 46.  $\text{KMnO}_4 + \text{KI} + \text{H}_2\text{O} \rightarrow$   
 47.  $\text{KMnO}_4 + \text{H}_2\text{S} + \text{H}_2\text{SO}_4 \rightarrow$   
 48.  $\text{KMnO}_4 + \text{Na}_2\text{SO}_3 + \text{KOH} \rightarrow$   
 49.  $\text{KMnO}_4 + \text{NaNO}_2 + \text{H}_2\text{O} \rightarrow$   
 50.  $\text{KMnO}_4 + \text{H}_2\text{O}_2 + \text{H}_2\text{SO}_4 \rightarrow$   
 51.  $\text{MnSO}_4 + \text{NaBiO}_3 + \text{HNO}_3 \rightarrow$   
 52.  $\text{HReO}_4 \rightarrow$   
 53.  $\text{Mn}_3\text{O}_4 \text{ (t)} \rightarrow$   
 54.  $\text{K}_2\text{MnO}_4 + \text{H}_2\text{O} \rightarrow$   
 55.  $\text{MnCl}_2 + \text{H}_2\text{O} \rightarrow$

### VIII группа, d-элементы

1.  $\text{Fe}_2\text{O}_3 + \text{CO} \rightarrow$   
 2.  $\text{Fe}_2\text{O}_3 + \text{Al} \rightarrow$   
 3.  $\text{Fe}_2\text{O}_3 + \text{H}_2 \rightarrow$   
 4.  $\text{Fe} + \text{CO (t, p)} \rightarrow$   
 5.  $\text{Ni} + \text{CO (t, p)} \rightarrow$   
 6.  $\text{Co} + \text{CO (t, p)} \rightarrow$   
 7.  $\text{FeCl}_3 + \text{H}_2 \rightarrow$   
 8.  $\text{Ni(CO)}_4 \text{ (t)} \rightarrow$   
 9.  $\text{NiO} + \text{C} \rightarrow$   
 10.  $\text{CoO} + \text{C} \rightarrow$   
 11.  $\text{Fe} + \text{H}_2\text{O (t)} \rightarrow$   
 12.  $\text{Fe} + \text{HCl} \rightarrow$   
 13.  $\text{Fe} + \text{HNO}_3 \text{ (p)} \rightarrow$   
 14.  $\text{NiO} + \text{Si} \rightarrow$   
 15.  $\text{Ni} + \text{H}_2\text{SO}_4 \text{ (p)} \rightarrow$   
 16.  $\text{Fe} + \text{H}_2\text{SO}_4 \text{ (к.) (t)} \rightarrow$   
 17.  $\text{Co} + \text{HNO}_3 \text{ (p)} \rightarrow$   
 18.  $\text{Ni} + \text{H}_2\text{O (t)} \rightarrow$   
 19.  $\text{FeC}_2\text{O}_4 \text{ (t, вакуум)} \rightarrow$   
 20.  $\text{Co(OH)}_2 \text{ (t)} \rightarrow$   
 21.  $\text{Ni}_2\text{O}_3 \text{ (t)} \rightarrow$   
 22.  $\text{Fe(OH)}_2 + \text{H}_2\text{SO}_4 \rightarrow$   
 23.  $\text{Fe}_2\text{O}_3 + \text{HCl} \rightarrow$   
 24.  $\text{Fe}_2\text{O}_3 + \text{NaOH (t)} \rightarrow$   
 25.  $\text{Fe(OH)}_3 + \text{H}_2\text{SO}_4 \rightarrow$   
 26.  $\text{Fe(OH)}_3 + \text{NaOH (t)} \rightarrow$   
 27.  $\text{Co(OH)}_3 + \text{H}_2\text{SO}_4 \rightarrow$   
 28.  $\text{Ni(OH)}_3 + \text{HCl} \rightarrow$   
 29.  $\text{Ni(OH)}_2 + \text{Br}_2 + \text{NaOH} \rightarrow$   
 30.  $\text{FeCl}_3 + \text{NaOH} \rightarrow$   
 31.  $\text{Fe}_3\text{O}_4 + \text{H}_2\text{SO}_4 \rightarrow$   
 32.  $\text{Co}_3\text{O}_4 + \text{H}_2\text{SO}_4 \rightarrow$   
 33.  $\text{Fe}_2\text{O}_3 + \text{KNO}_3 + \text{KOH} \rightarrow$   
 34.  $\text{K}_2\text{FeO}_4 + \text{HCl} \rightarrow$   
 35.  $\text{CoSO}_4 + \text{H}_2\text{O} \rightarrow$   
 36.  $\text{FeCl}_3 + \text{H}_2\text{O} \rightarrow$   
 37.  $\text{NaFeO}_2 + \text{H}_2\text{O} \rightarrow$   
 38.  $\text{FeCl}_2 + \text{Cu} \rightarrow$   
 39.  $\text{FeCl}_2 + \text{K}_3[\text{Fe(CN)}_6] \rightarrow$   
 40.  $\text{FeCl}_3 + \text{K}_4[\text{Fe(CN)}_6] \rightarrow$   
 41.  $\text{FeCl}_3 + \text{KCNS} \rightarrow$   
 42.  $\text{Fe(OH)}_2 + \text{O}_2 + \text{H}_2\text{O} \rightarrow$   
 43.  $\text{Co(OH)}_2 + \text{H}_2\text{O}_2 \rightarrow$   
 44.  $\text{Co(NO}_3)_2 \text{ (t)} \rightarrow$   
 45.  $\text{K}_2\text{FeO}_4 + \text{NH}_4\text{OH} \rightarrow$   
 46.  $\text{Fe} + \text{S (t)} \rightarrow$   
 47.  $\text{Fe} + \text{O}_2 \rightarrow$   
 48.  $\text{K}_4[\text{Fe(CN)}_6] + \text{Cl}_2 \rightarrow$   
 49.  $\text{K}_3[\text{Fe(CN)}_6] + \text{Pb(NO}_3)_2 \rightarrow$   
 50.  $\text{Fe(CN)}_2 + \text{KCN} \rightarrow$   
 51.  $\text{FeCl}_2 + \text{NH}_3 \rightarrow$   
 52.  $\text{FeS}_2 + \text{O}_2 \rightarrow$   
 53.  $\text{FeCl}_3 + \text{Fe} \rightarrow$   
 54.  $\text{FeCl}_2 + (\text{NH}_4)_2\text{S} \rightarrow$   
 55.  $\text{FeCl}_3 + \text{CuO} \rightarrow$   
 56.  $\text{FeCl}_3 + \text{KI} \rightarrow$