

# VI A Grupās elementi

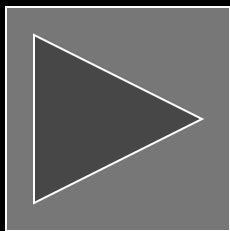
Preiļu Valsts ģimnāzija

Ķīmija

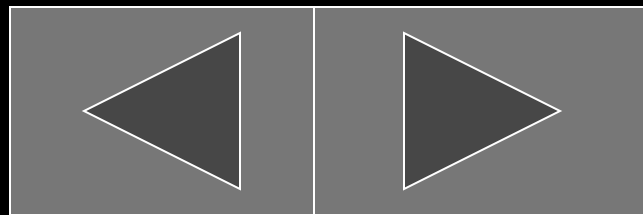
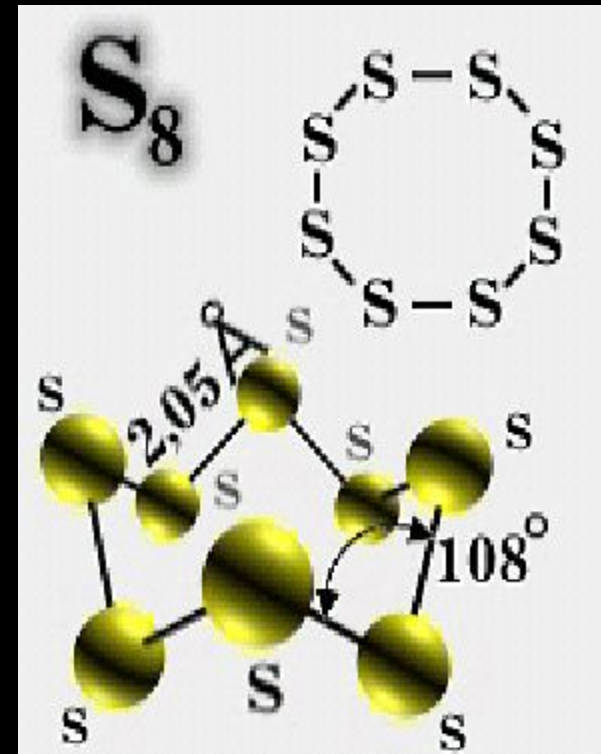
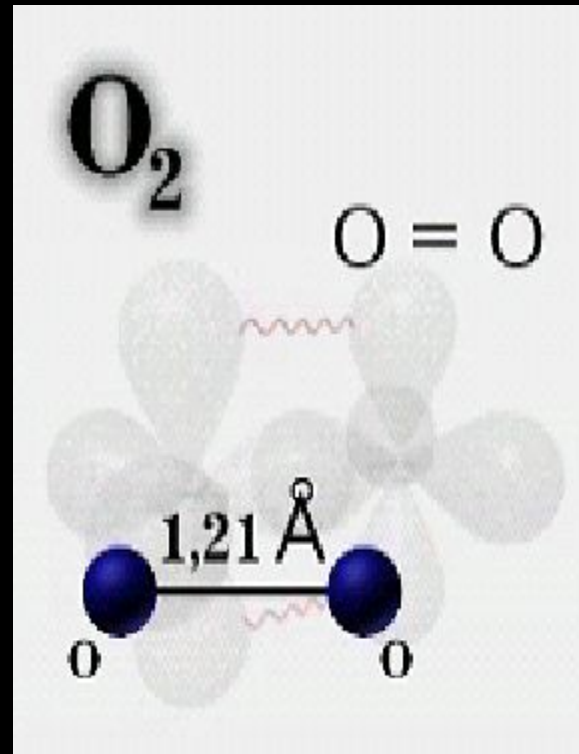
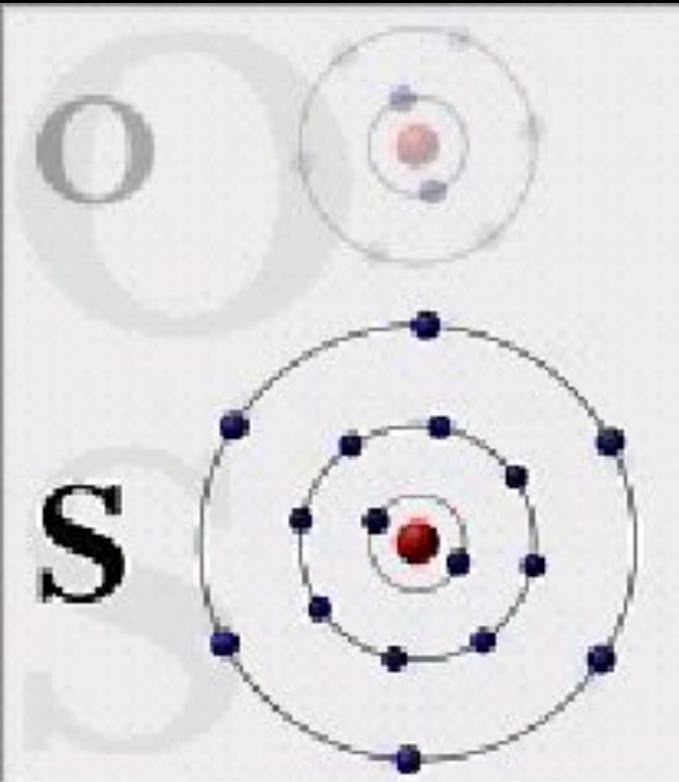
Sk. Francis Livmanis



V	VI	(H)
7 14,00674 5,07 0,012 <b>N</b> АЗОТ	8 15,9994 3,50 0,045 <b>O</b> КИСЛОРОД	9 15,9984032 4,10 0,040 <b>F</b> ФТОР
15 30,973762 1,10 0,092 <b>P</b> ФОСФОР	16 32,066 2,60 0,081 <b>S</b> СЕРА	17 35,453 2,33 0,073 <b>Cl</b> ХЛОР
23 50,9415 <b>V</b> ВАНАДИЙ	24 51,9961 <b>Cr</b> ХРОМ	25 54,93805 <b>Mn</b> МАРГАНЕЦ
33 74,92159 2,39 0,190 <b>As</b> МЫШЬЯК	34 78,96 2,48 0,092 <b>Se</b> СЕЛЕН	35 79,904 2,34 0,085 <b>Br</b> БРОМ
41 92,90638 <b>Nb</b> НИОБИЙ	42 95,94 <b>Mo</b> МОЛИБДЕН	43 97,9072 <b>Tc</b> ТЕХНЕЦИЙ
51 121,75 1,83 0,119 <b>Sb</b> СУРЬМА	52 127,60 2,01 0,111 <b>Te</b> ТЕЛУР	53 126,90447 2,31 0,105 <b>I</b> ИОД
73 180,9479 <b>Ta</b> ТАНТАЛ	74 183,85 <b>W</b> ВОЛЬФРАМ	75 186,207 <b>Re</b> РЕНИЙ
83 208,98037 1,87 0,138 <b>Bi</b> ВИСМУТ	84 208,9824 <b>Po</b> ПОЛОНИЙ	85 209,987 1,90 0,115 <b>At</b> АСТАТ
105 262,114 <b>(Ns)</b> НИЛЬСБОРГИЙ	106 263,118 <b>(H)</b>	107 262,12 <b>(H)</b>



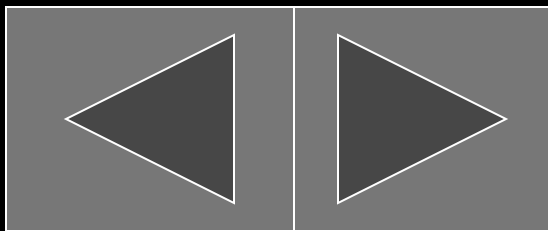
# Atoma uzbūve



# Fizikālās īpašības

<sup>16</sup> O	99,76%
<sup>17</sup> O	0,04%
<sup>18</sup> O	0,2%

Elementa simbols	O	S	Se	Te	Po	
Kodola lādiņš	8	16	34	52	84	
Blīvums g/cm <sup>3</sup>	1,43 g/l	2.07	4.79	6.25	9.32	
t <sup>0</sup> kuš.	°C	-218.8	119.3	217	449.8	254
	°K	54.4	392.5	490.2	723.0	527.2
t <sup>0</sup> vār.	°C	-183.0	444.6	685	990	962
	°K	90.2	717.8	958.2	1263.2	1235.2



# Oksidēšanās pakāpes

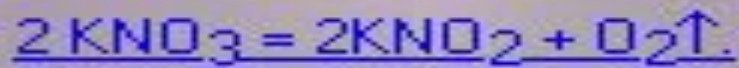
$O^{-2}$	$H_2O, CaO, CO, N_2O$
$O^{-1}$	$H_2O_2, BaO_2, KHO_2$
$O^0$	$O, O_2, O_3$
$O^{+1}$	$F_2O_2$
$O^{+2}$	$F_2O$
$S^{-2}$	$H_2S, FeS$
$S^{-1}$	$H_2S_2, FeS_2$
$S^0$	$S, S_2, S_8$
$S^{+4}$	$SO_2, H_2SO_3, K_2SO_3$
$S^{+6}$	$SO_3, SO_2Cl_2, H_2SO_4, K_2SO_4, KHSO_4, Na_2S_2O_7$



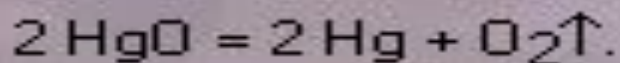


# Skābekļa iegūšana

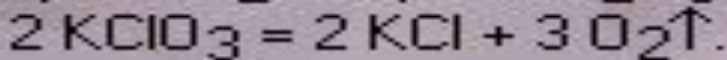
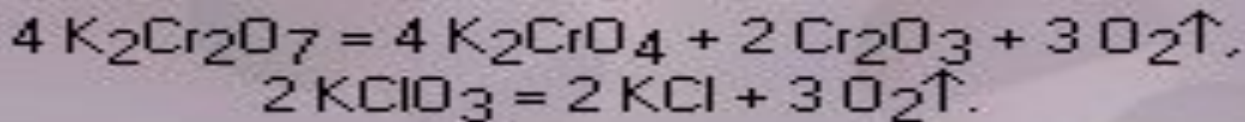
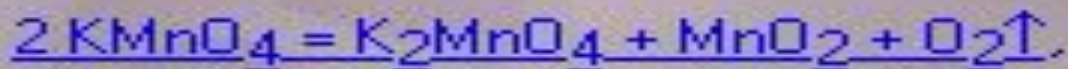
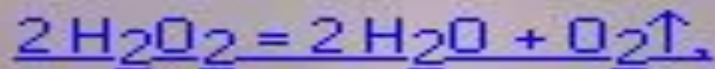
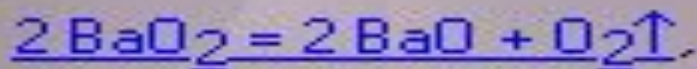
Zviedru ķīmiķis K.Šēle ap 1770. gadu ieguva molekulāru skābekli, karsējot salpetri.



1774. gadā angļu ķīmiķis Dž.Pristli ieguva skābekli karsējot HgO

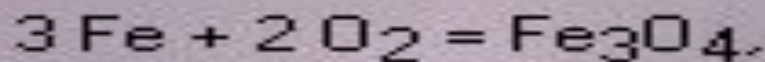
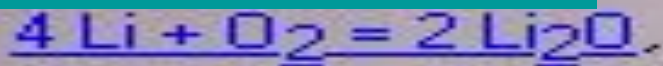


Laboratorijas apstākļos skābekli parasti iegūst:

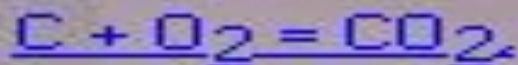
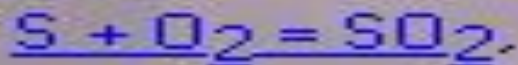
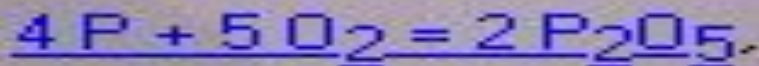


# Skābekļa ķīmiskās īpašības

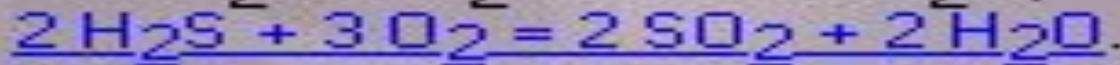
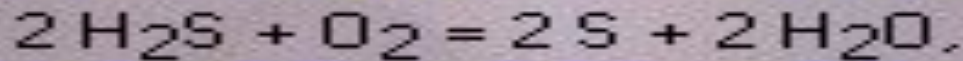
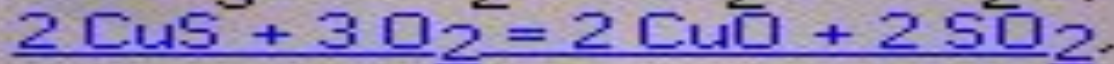
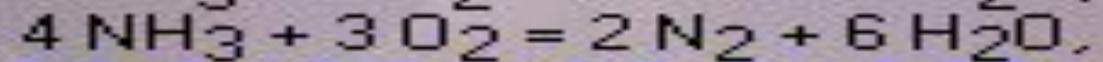
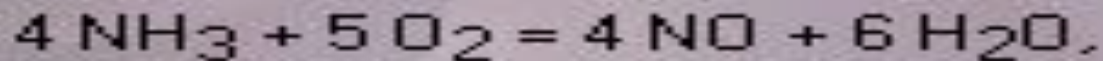
## Reaģē ar metāliem



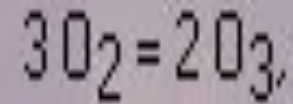
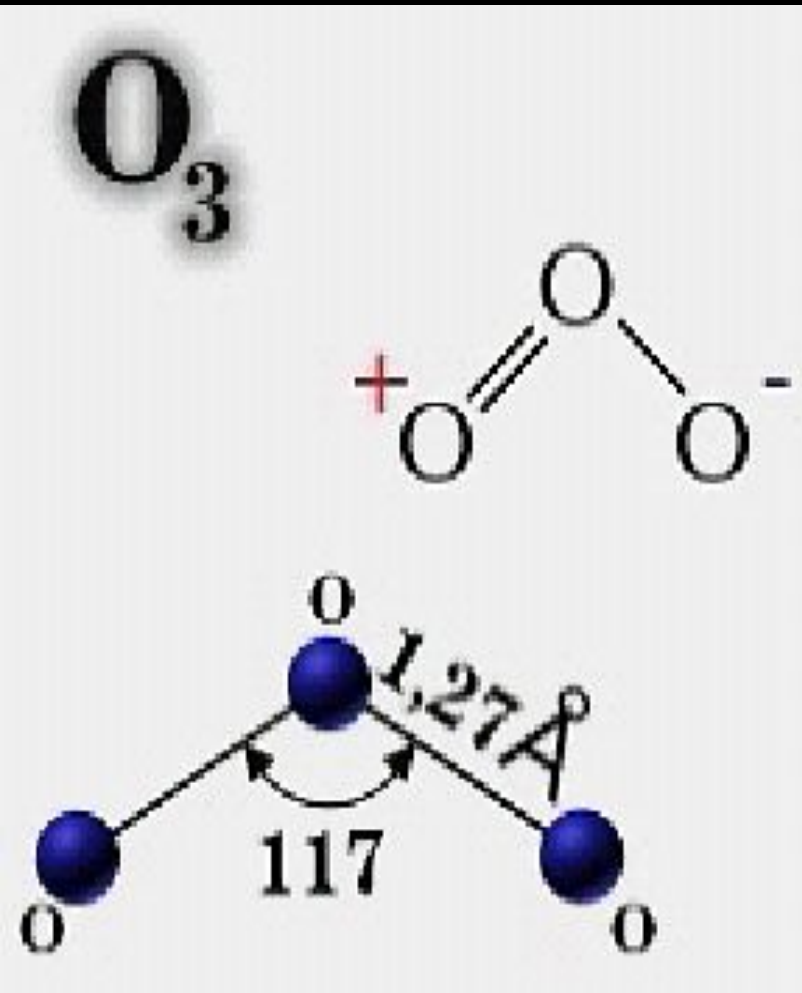
## Reaģē ar nemetāliem



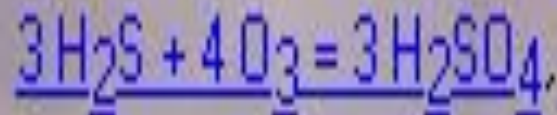
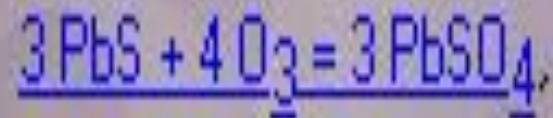
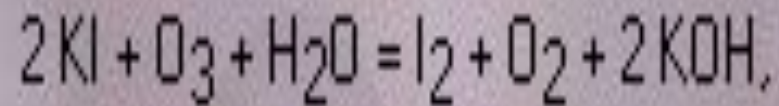
## Reaģē ar saliktām vielām



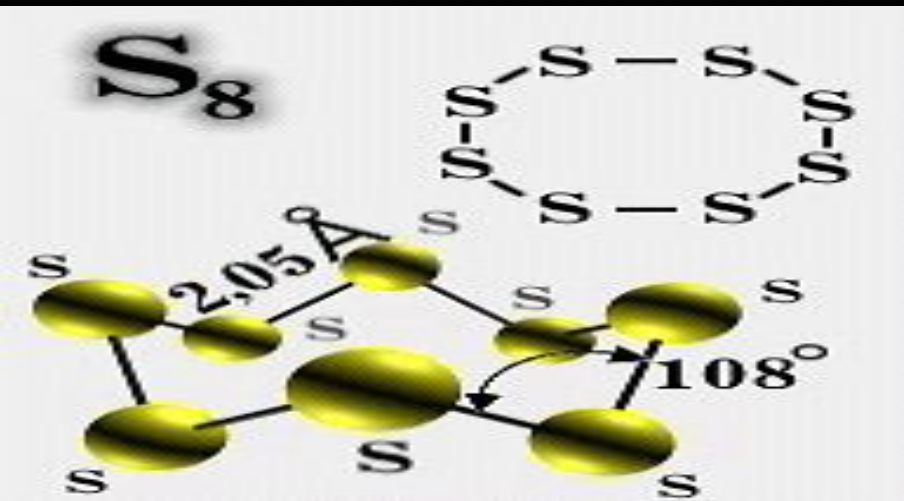
# Ozons



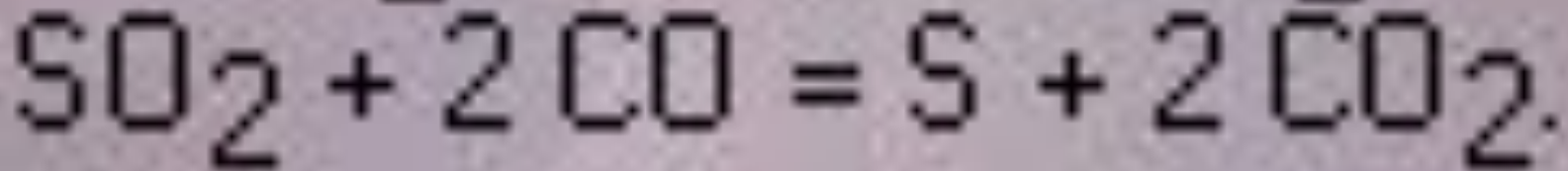
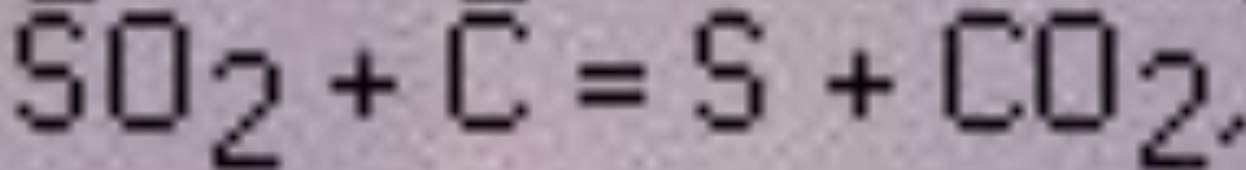
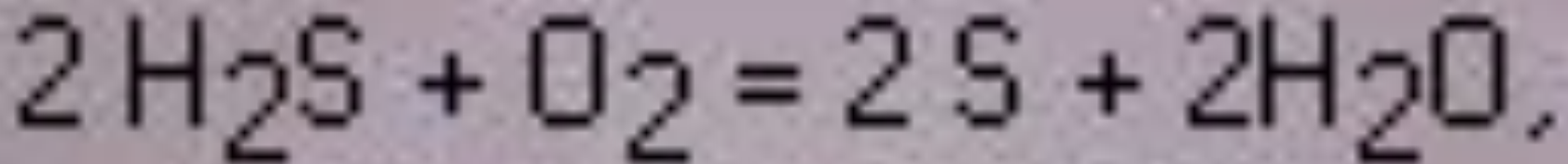
Ozons ir vēl spēcīgāks oksidētājs nekā skābeklis



# Sērs

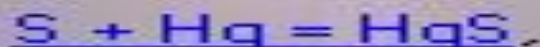


Sēra iegūšana un tā  
alotropiskie veidi.





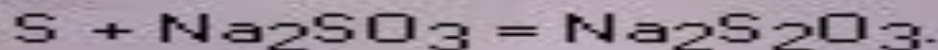
# Sēra ķīmiskās īpašības



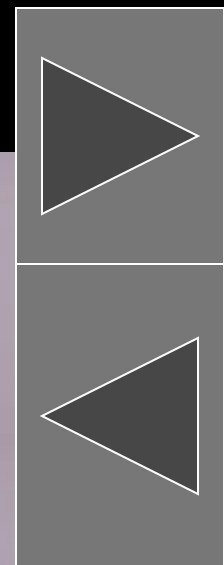
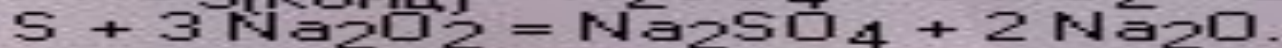
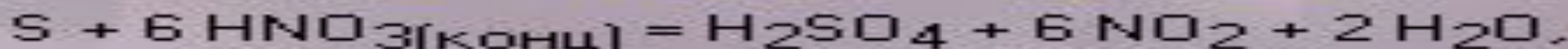
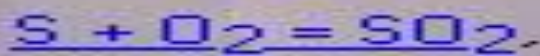
Reaģē ar metāliem un nemetāliem



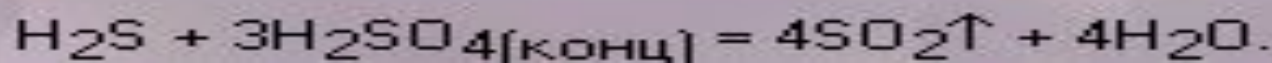
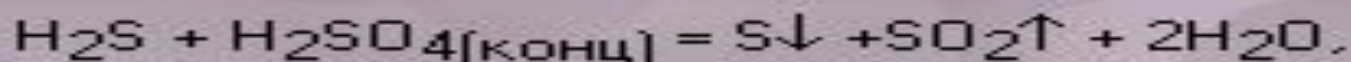
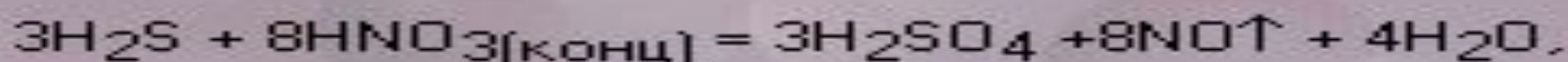
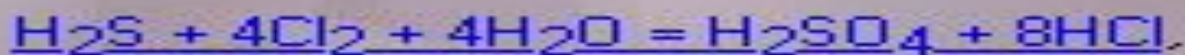
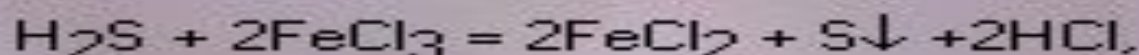
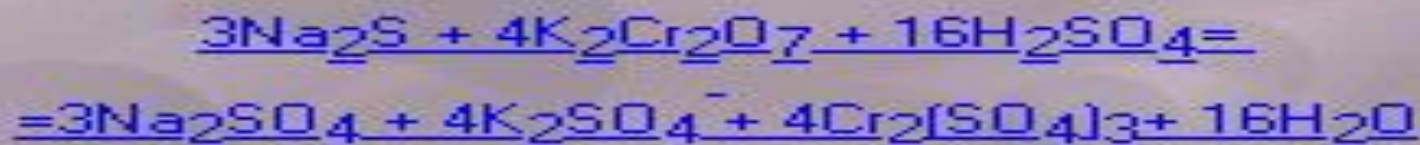
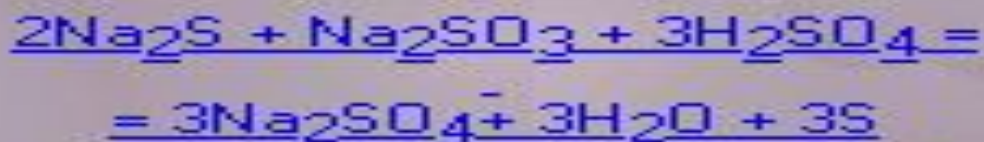
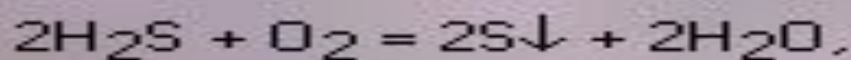
Šķīst koncentrētā nātrija sulfīta šķīdumā



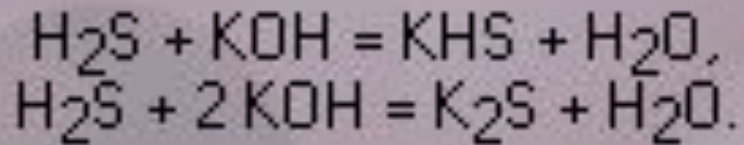
Ar spēcīgiem oksidētājiem sērs uzrāda reducētāja īpašības



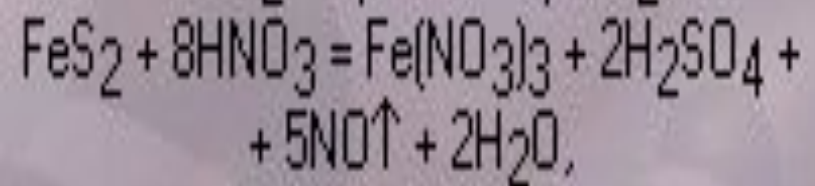
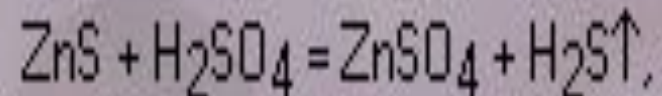
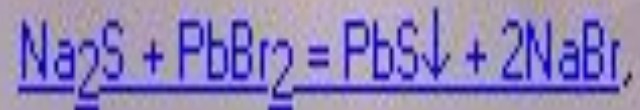
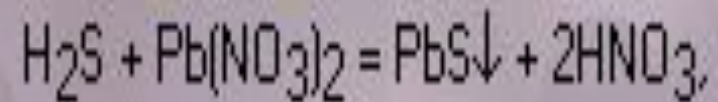
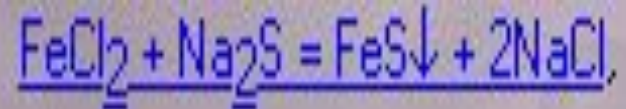
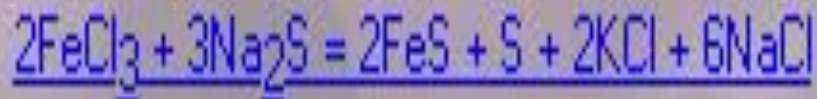
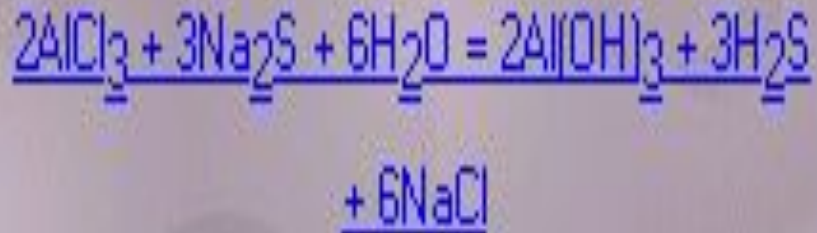
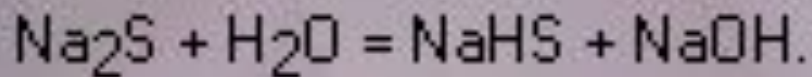
# Sērūdeņradis



# Sulfīdi



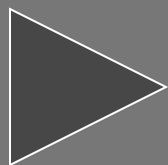
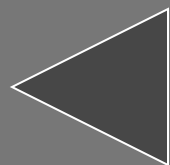
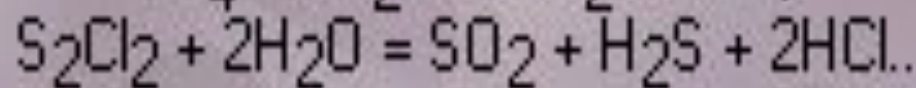
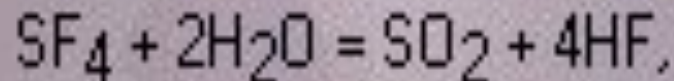
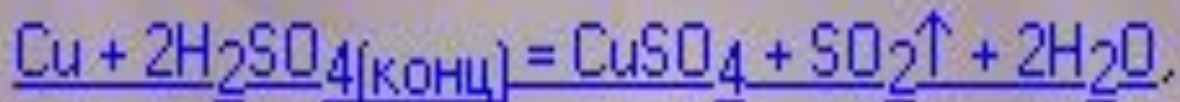
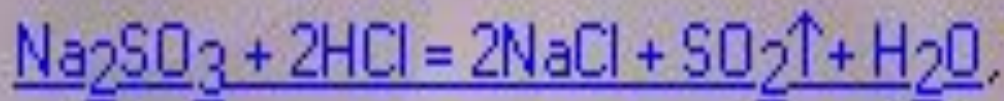
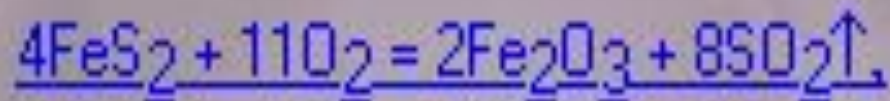
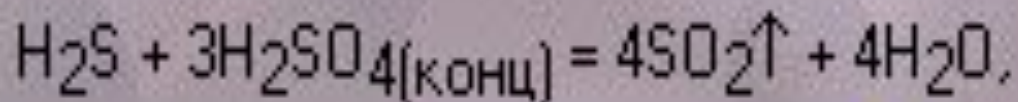
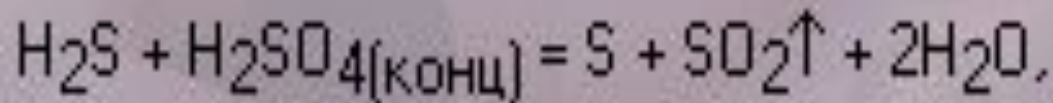
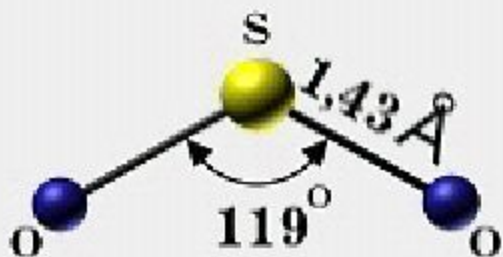
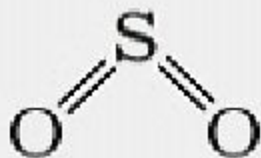
Sārnu metālu sulfīdu ūdens šķīdumi ir stipri hidrolizēti, bet sārmzemju MeS slikti šķīst ūdenī.





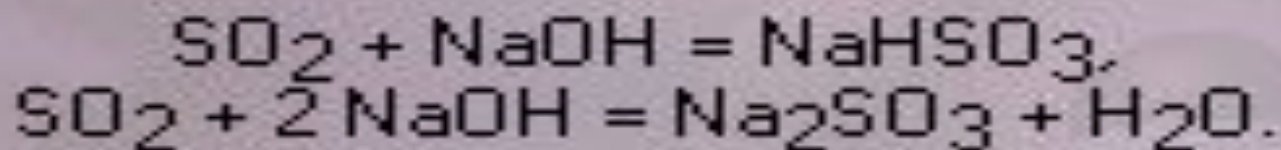
# Sēra dioksīda iegūšana

**SO<sub>2</sub>**

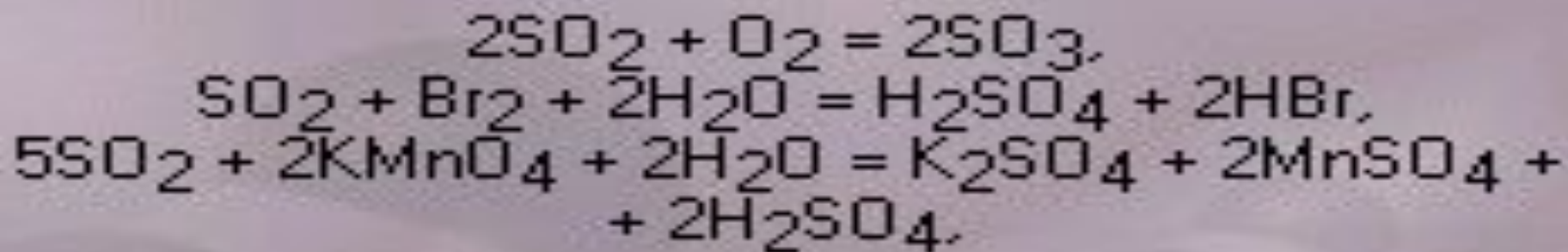




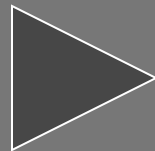
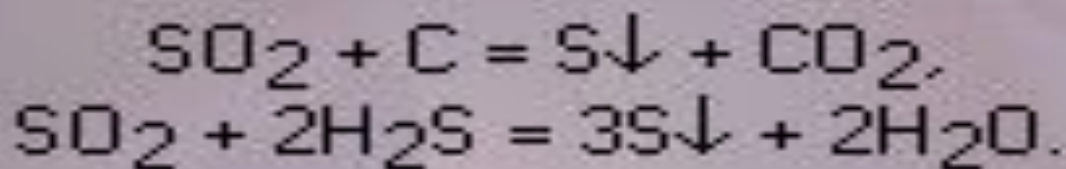
# SO<sub>2</sub> ķīmiskās īpašības



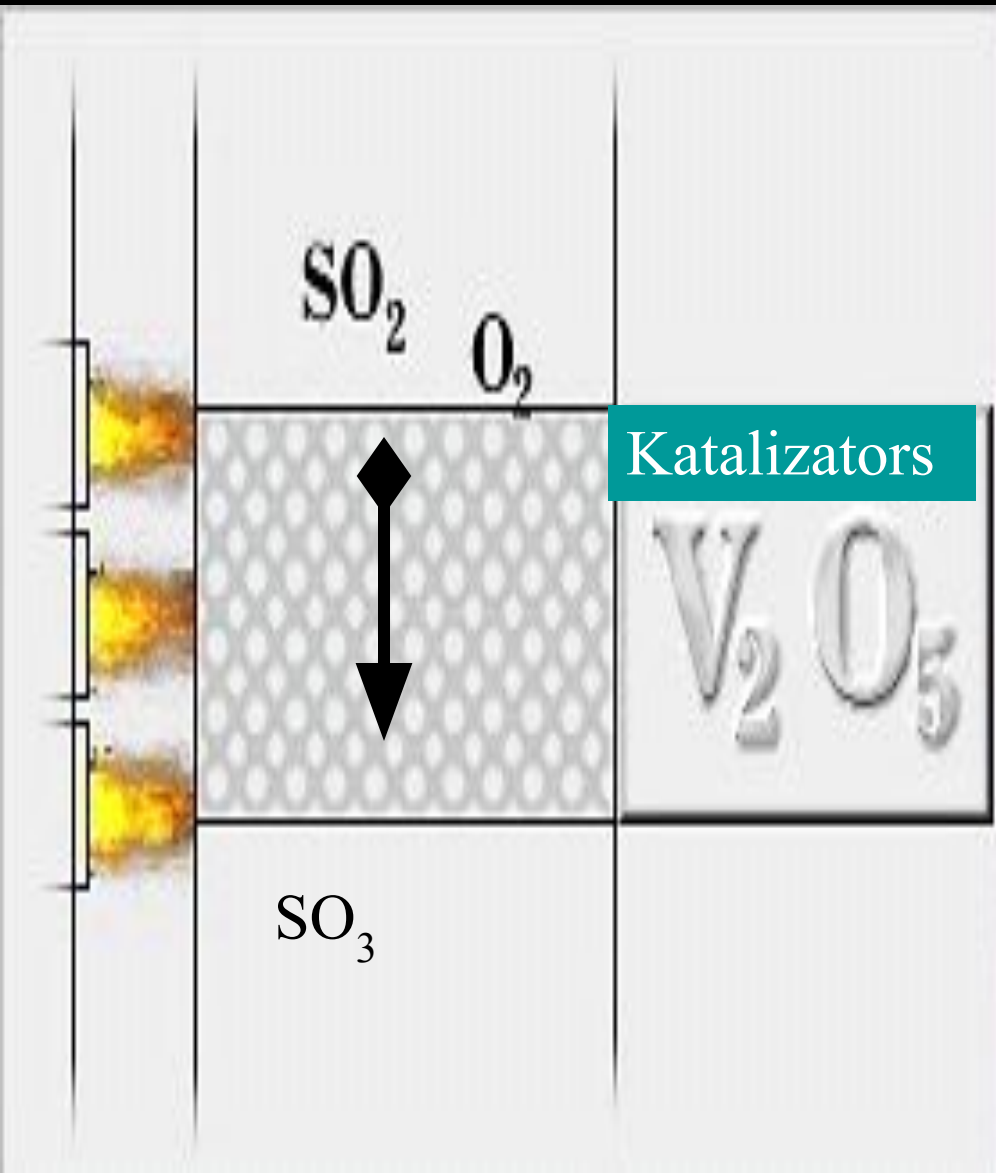
Sēra dioksīds reakcijās var būt spēcīgs reducētājs



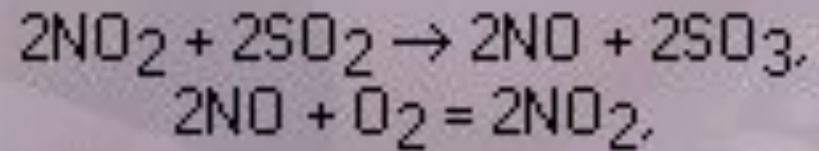
Tas var būt arī oksidētājs



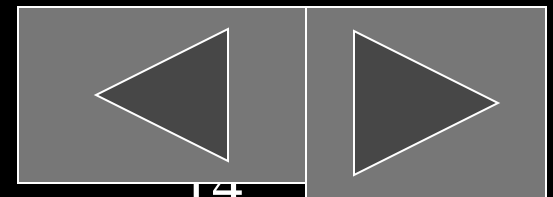
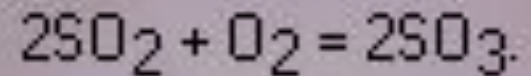
# Sēra dioksīda oksidēšana



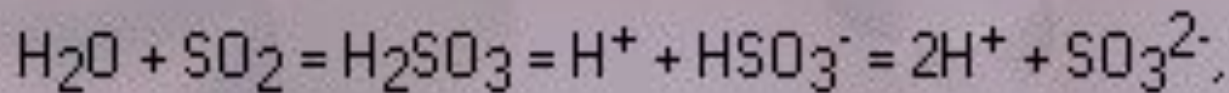
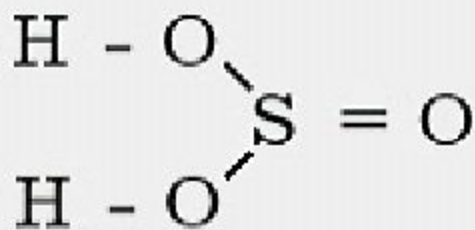
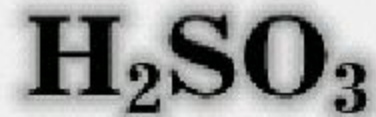
Agrāk sēra dioksīdu oksidēja par sēra trioksīdu ar NO<sub>2</sub>



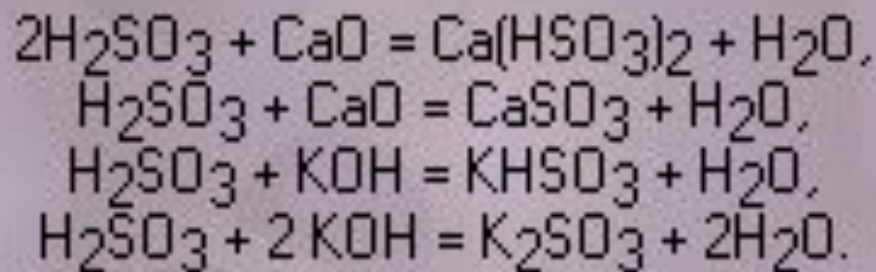
Rezultātā



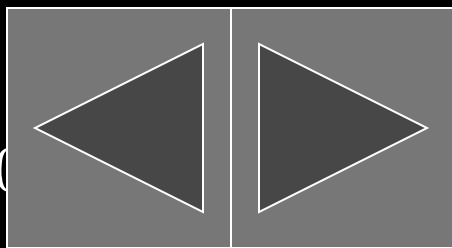
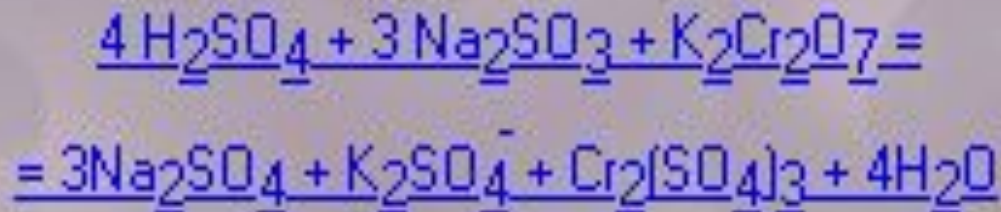
# Sērpaskābe un tās sāļi



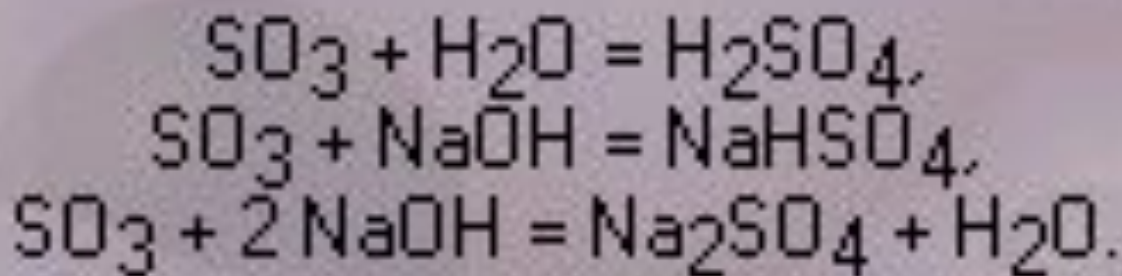
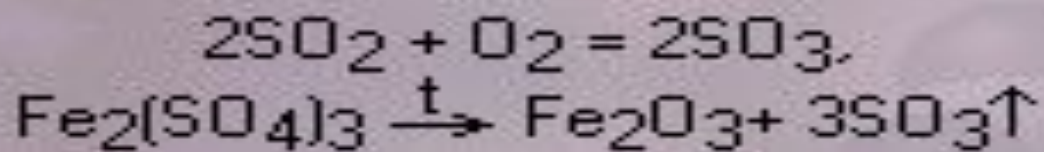
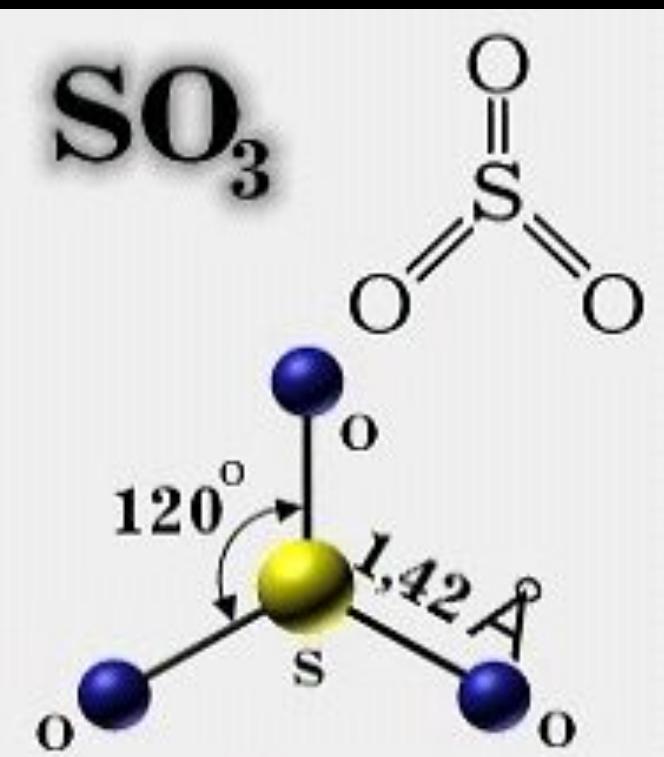
Reaģē ar bāziskajiem oksīdiem un bāzēm



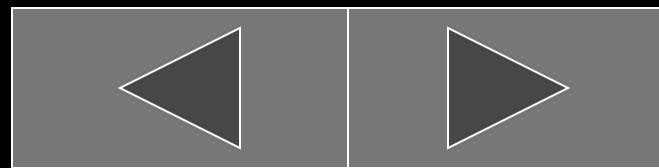
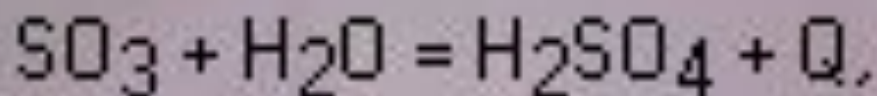
Sulfīti ir spēcīgi reducētāji



# Sēra trioksīds

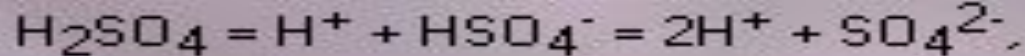
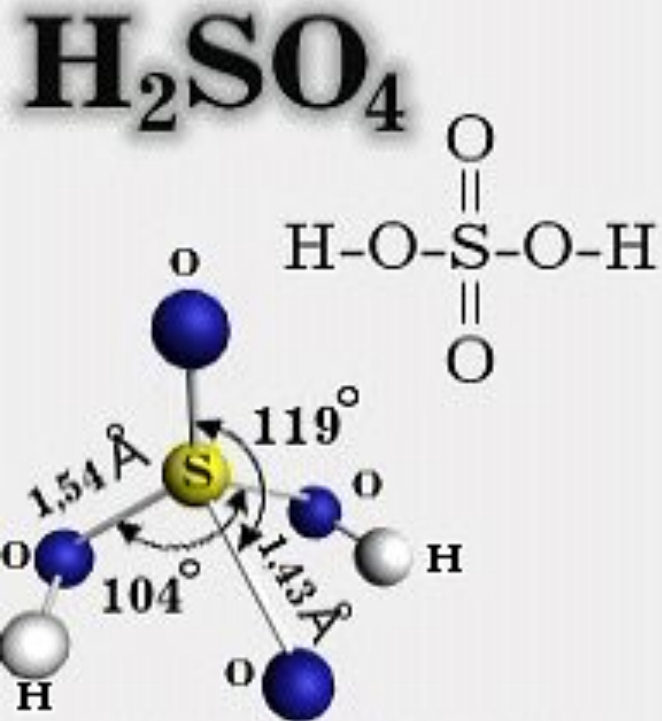


Reaģējot ar ūdeni veido sērskābi

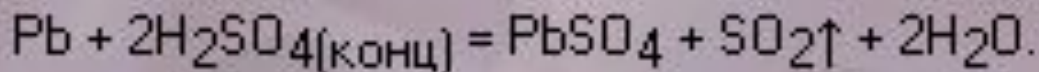
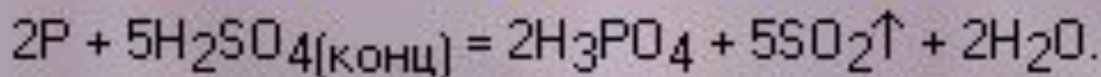
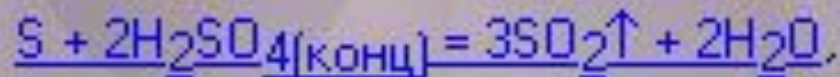
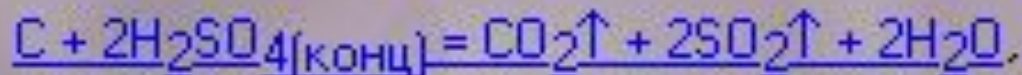
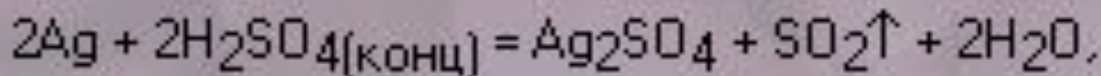
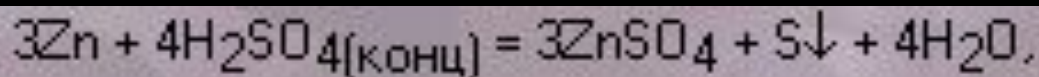
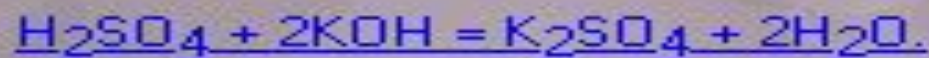
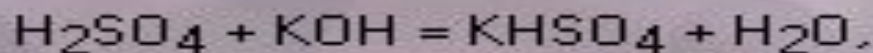
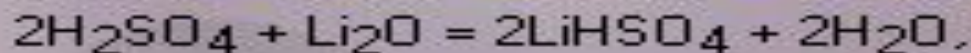
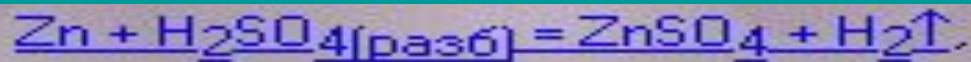




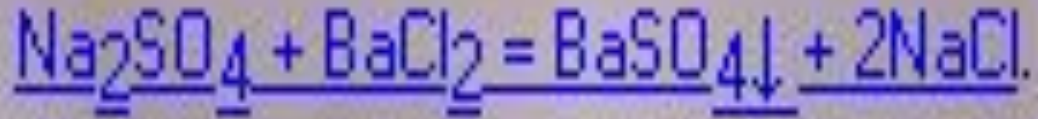
# Sērskābe



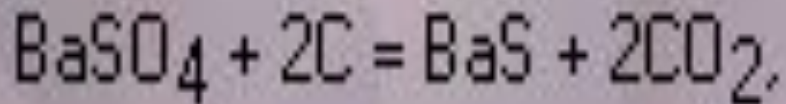
Reaģē ar metāliem, bāziskajiem oksīdiem un hidroksīdiem



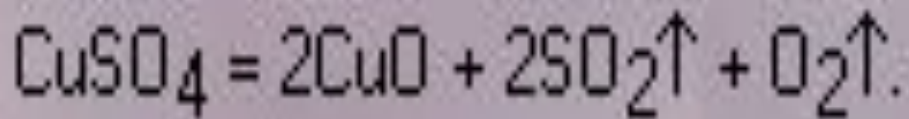
# Sērskābes sāļi



Karsējot oksidētāju klātbūtnē var notikt reakcija



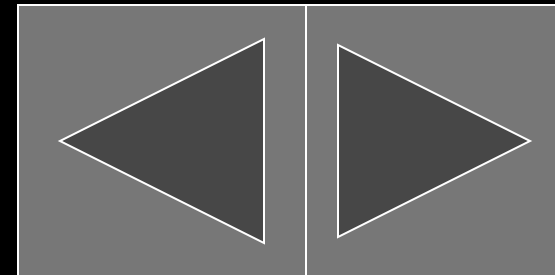
Sulfātu sadalīšanās



09/03/2023



Sulfātjona  
pierādīšana



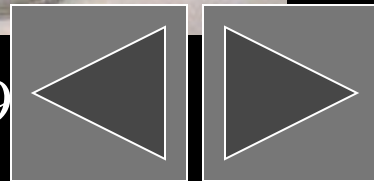
# Eksperimenti



Attēlos redzamas Al un Zn reakcijas ar sēru. Uzrakstiet reakciju vienādojumus! Kas šajās reakcijās ir oksidētājs un kas reducētājs?

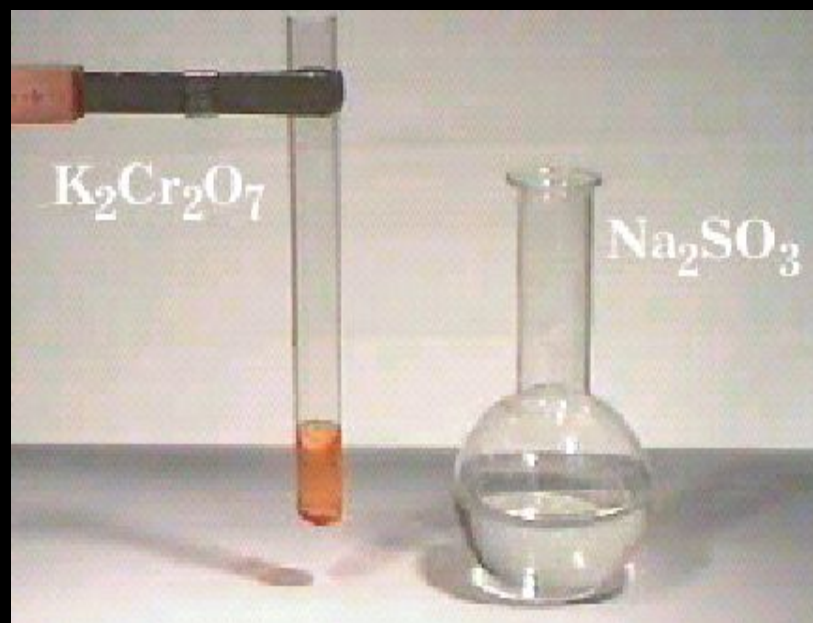


Uzrakstiet reakcijas vienādojumu!





# Eksperimenti



Uzrakstiet reakciju  
vienādojumus cukura  
reakcijai ar sērskābi un  
pārejos!

