

## Uitwerkingen Basischemie hoofdstuk 2

### Opgave 2.1 Elementen leren

Maak met de afbeeldingen 2.1A en 2.1B kaartjes met aan de ene kant de naam van het element en aan de andere kant het symbool en ga oefenen.

### Opgave 2.2 Meer elementen

- a. Co
- b. Mn
- c. Zn
- d. U

Geef naam en atoomnummer van de elementen met de symbolen:

- e. Tin 50
- f. Argon 18
- g. Borium 5
- h. Barium 56

### Opgave 2.3 Hoeveel atomen?

- a. HCN 1 H; 1 C; 1 N
- b. HNO<sub>3</sub> 1 H; 1 N; 3 O
- c. C<sub>12</sub>H<sub>22</sub>O<sub>11</sub> 12 C; 22 H; 11 O;
- d. Pb<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> 3 Pb; 2 P; 8 O

### Opgave 2.4 Hoeveel atomen?

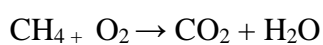
- a. CH<sub>3</sub>CH<sub>2</sub>COOH 3 C; 6 H; 2 O
- b. NH<sub>4</sub>Cr(SO<sub>4</sub>)<sub>2</sub>·12H<sub>2</sub>O 1 N; 28 H; 1 Cr; 2 S; 20 O
- c. CH<sub>3</sub>CHNH<sub>2</sub>COOH 3 C; 7 H; 1 N
- d. 5 H<sub>2</sub>O + 5 C<sub>2</sub>H<sub>5</sub>OH 40 H; 10 O; 10 C

### Opgave 2.5 Ontleden van water

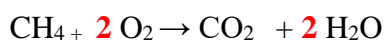
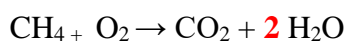
- a. water → waterstof + zuurstof  
 $2 \text{H}_2\text{O} \rightarrow 2 \text{H}_2 + \text{O}_2$
- b. In de rechterbuis zit waterstof, omdat het volume en dus ook het aantal moleculen 2x zo groot is.

### Opgave 2.6 Verbranding van aardgas

aardgas + zuurstof → kooldioxide + water

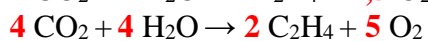
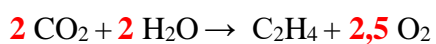
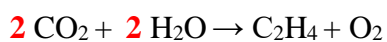
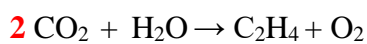
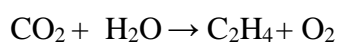


	voor	na
C	1	1
H	4	2
O	2	3
	voor	na
C	1	1
H	4	4
O	2	4
	voor	na
C	1	1
H	4	4
O	4	4



### Opgave 2.7 Etheen maken met kooldioxide en water

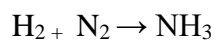
kooldioxide + water → etheen + zuurstof



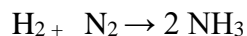
	voor	na
C	1	2
H	2	4
O	3	2
	voor	na
C	2	2
H	2	4
O	3	3
	voor	na
C	2	2
H	4	4
O	4	2
	voor	na
C	4	4
H	8	8
O	10	10

**Opgave 2.8 Maken van ammoniak**

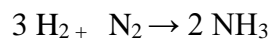
waterstof + stikstof → ammoniak



	voor	na
N	2	1
H	2	3



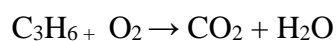
	voor	na
N	2	2
H	2	6



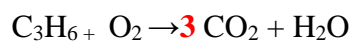
	voor	na
N	2	2
H	6	6

**Opgave 2.9 Verbranding van propaan**

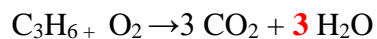
propaan + zuurstof → kooldioxide + water



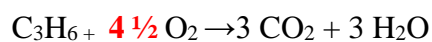
	voor	na
C	3	1
H	6	2



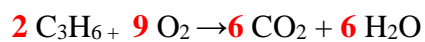
	voor	na
O	2	3



	voor	na
C	3	3
H	6	2



	voor	na
O	2	7



	voor	na
C	3	3
H	6	6

	voor	na
O	2	9

	voor	na
C	3	3
H	6	6

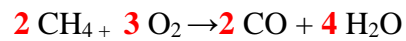
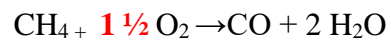
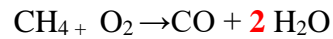
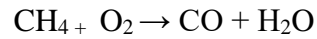
	voor	na
O	9	9

	voor	na
C	6	6

	voor	na
H	12	12
O	18	18

### Opgave 2.10 Onvolledige verbranding

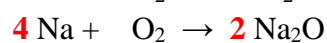
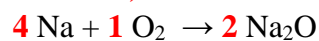
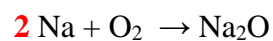
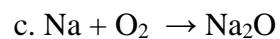
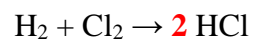
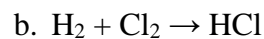
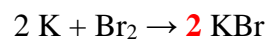
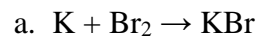
aardgas + zuurstof → koolmonoxide + water



	voor	na
C	1	1
H	4	2
O	2	2
	voor	na
C	1	1
H	4	4
O	2	3
	voor	na
C	1	1
H	4	4
O	3	3
	voor	na
C	2	2
H	8	8
O	6	6

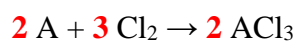
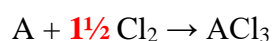
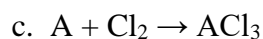
### Opgave 2.11 Kloppend maken oefenen

**BASIS**

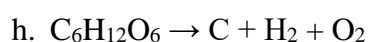
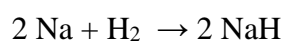
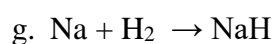
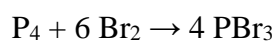
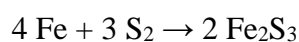
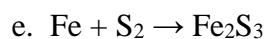
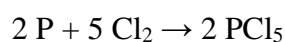
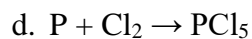


	voor	na
K	1	1
Br	2	1
	voor	na
K	2	2
Br	2	2
	voor	na
H	2	1
Cl	2	1
	voor	na
H	2	2
Cl	2	2

	voor	na
Na	1	2
O	2	1
	voor	na
Na	2	2
O	2	1
	voor	na
Na	4	4
O	2	2

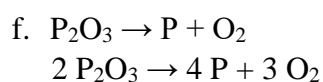
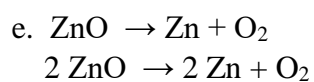
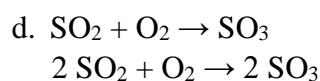
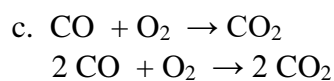
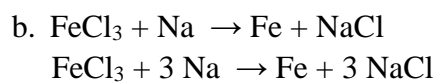
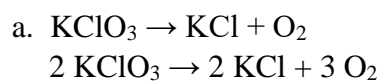


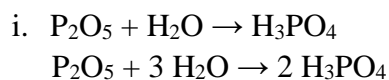
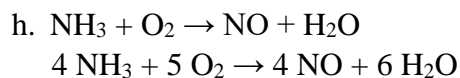
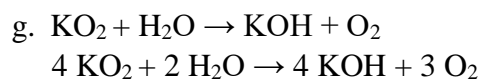
	voor	na
A	1	1
Cl	3	3
	voor	na
A	2	2
Cl	6	6



### Opgave 2.12 Kloppend maken oefenen

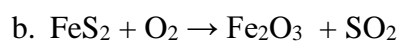
GEMIDDELD



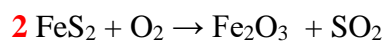


**Opgave 2.13 Kloppend maken oefenen**

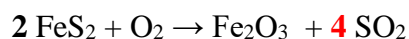
**UITDAGING!!**



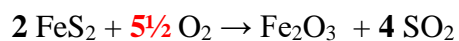
	voor	na
Fe	1	2
S	2	1
O	2	5



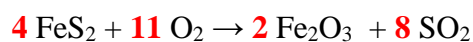
	voor	na
Fe	2	2
S	4	1
O	2	5



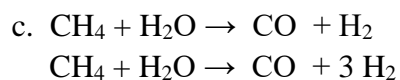
	voor	na
Fe	2	2
S	4	4
O	2	11

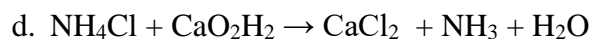


	voor	na
Fe	2	2
S	4	4
O	11	11

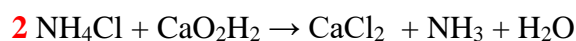


	voor	na
Fe	4	4
S	8	8
O	22	22

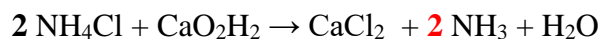




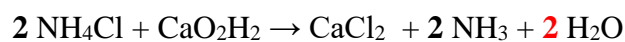
	voor	na
Ca	1	1
Cl	1	2
N	1	1
H	6	5
O	2	1



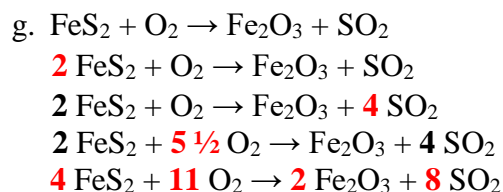
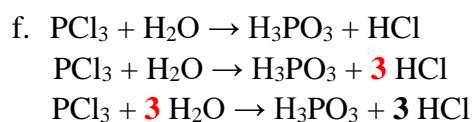
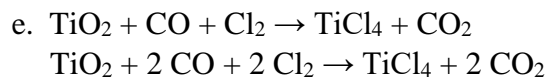
	voor	na
Ca	1	1
Cl	<b>2</b>	2
N	<b>2</b>	1
H	<b>10</b>	5
O	2	1



	voor	na
Ca	1	1
Cl	2	2
N	2	<b>2</b>
H	10	<b>8</b>
O	2	1



	voor	na
Ca	1	1
Cl	2	2
N	2	2
H	10	<b>10</b>
O	2	<b>2</b>



- h.  $C_6H_6O + O_2 \rightarrow CO_2 + H_2O$   
 $C_6H_6O + O_2 \rightarrow 6 CO_2 + H_2O$   
 $C_6H_6O + O_2 \rightarrow 6 CO_2 + 3 H_2O$   
 $C_6H_6O + 7 O_2 \rightarrow 6 CO_2 + 3 H_2O$
- i.  $CO_2 + H_2O \rightarrow C_6H_{12}O_6 + O_2$   
 $6 CO_2 + H_2O \rightarrow C_6H_{12}O_6 + O_2$   
 $6 CO_2 + 6 H_2O \rightarrow C_6H_{12}O_6 + O_2$   
 $6 CO_2 + 6 H_2O \rightarrow C_6H_{12}O_6 + 6 O_2$

### Opgave 2.14 Kloppend maken oefenen

Nog meer oefenen?  
 Gebruik de website van PhET.  
 Noteer alle tussenstappen!

Kies je niveau



### Opgave 2.15 Kunstmest maken

Kunstmest wordt gemaakt door een reeks van zes reacties achter elkaar uit te voeren.

1. In het eerste vat reageert water met aardgas. Hierbij ontstaan waterstof en koolstofmonoxide.
2. Waterstof reageert met stikstof uit de lucht tot ammoniak.
3. Ammoniak reageert met zuurstof. Bij deze reactie ontstaan stikstofmonoxide en water.
4. Stikstofmonoxide reageert met zuurstof tot stikstofdioxide ( $NO_2$ )
5. Stikstofdioxide reageert met water tot salpeterzuur ( $HNO_3$ ) en stikstofmonoxide.
6. Ten slotte reageert salpeterzuur met ammoniak tot het gewenste eindproduct ammoniumnitraat ( $NH_4NO_3$ ).

- a.
1. aardgas + water  $\rightarrow$  koolmonoxide + waterstof
  2. stikstof + waterstof  $\rightarrow$  ammoniak
  3. ammoniak + zuurstof  $\rightarrow$  stikstofmonoxide + water
  4. stikstofmonoxide + zuurstof  $\rightarrow$  stikstofdioxide
  5. stikstofdioxide + water  $\rightarrow$  salpeterzuur + stikstofmonoxide
  6. salpeterzuur + ammoniak  $\rightarrow$  ammoniumnitraat



b.

