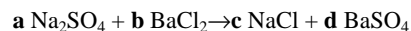


AJUSTE DE REACCIONES QUÍMICAS

1. Ajusta la reacción química $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{NaCl} + \text{BaSO}_4$



$$\text{Na: } 2a = c$$

$$\text{S: } a = d$$

$$\text{O: } 4a = 4d$$

$$\text{Ba: } b = d$$

$$\text{Cl: } 2b = c$$

Si asignamos a d el valor 1: $d = 1$, tendremos

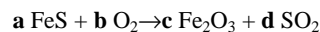
$$a = d \Rightarrow a = 1$$

$$b = d \Rightarrow b = 1$$

$$2b = c \Rightarrow 2 \cdot 1 = c \Rightarrow 2 = c \Rightarrow c = 2$$

La ecuación ajustada es la siguiente: $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow 2 \text{NaCl} + \text{BaSO}_4$

2. Ajusta la reacción química $\text{FeS} + \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2$



$$\text{Fe: } a = 2c$$

$$\text{S: } a = d$$

$$\text{O: } 2b = 3c + 2d$$

Si asignamos el valor 1 $\rightarrow a = 1$, quedará

$$a = 2c \Rightarrow a / 2 = c \Rightarrow 1 / 2 = c \Rightarrow c = 1/2 = 0,5$$

$$a = d \Rightarrow 1 = d \Rightarrow d = 1$$

$$2b = 3c + 2d \Rightarrow 2b = 3 \cdot 0,5 + 2 \cdot 1 = 1,5 + 2 = 3,5 \Rightarrow b = 3,5 / 2 = 1,75$$

Para evitar números decimales, multiplicamos por cuatro todos los coeficientes:

$$a = 1 \cdot 4 = 4$$

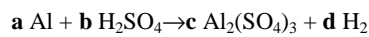
$$b = 1,75 \cdot 4 = 7$$

$$c = 0,5 \cdot 4 = 2$$

$$d = 1 \cdot 4 = 4$$

La ecuación ajustada es la siguiente: $4 \text{FeS} + 7 \text{O}_2 \rightarrow 2 \text{Fe}_2\text{O}_3 + 4 \text{SO}_2$

3. Ajusta la reacción química $\text{Al} + \text{H}_2\text{SO}_4 \rightarrow \text{Al}_2(\text{SO}_4)_3 + \text{H}_2$



$$\text{Al: } a = 2c$$

$$\text{H: } 2b = 2d$$

$$\text{S: } b = 3c$$

$$\text{O: } 4b = 12c$$

Si asignamos $d = 1$, quedará:

$$2b = 2d \Rightarrow b = d \Rightarrow b = 1$$

$$b = 3c \Rightarrow 1 = 3c \Rightarrow 1 / 3 = c \Rightarrow c = 1/3$$

$$a = 2 \cdot c \Rightarrow a = 2 \cdot 1/3 \Rightarrow a = 2/3$$

Si multiplicamos por tres todos los coeficientes para eliminar fracciones:

$$a = (2/3) \cdot 3 \Rightarrow a = 2$$

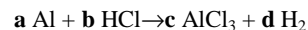
$$b = 1 \cdot 3 = 3$$

$$c = (1/3) \cdot 3 \Rightarrow c = 1$$

$$d = 1 \cdot 3 = 3$$

La ecuación ajustada queda: $2 \text{Al} + 3 \text{H}_2\text{SO}_4 \rightarrow \text{Al}_2(\text{SO}_4)_3 + 3 \text{H}_2$

4. Ajusta la reacción química $\text{Al} + \text{HCl} \rightarrow \text{AlCl}_3 + \text{H}_2$



$$\text{Al: } a = c$$

$$\text{H: } b = 2d$$

$$\text{Cl: } b = 3c$$

Si asignamos a c el valor 1: $c = 1$, quedará

$$a = c \Rightarrow a = 1$$

$$b = 3 \cdot c \Rightarrow b = 3 \cdot 1 \Rightarrow b = 3$$

$$b = 2d \Rightarrow 3 = 2d \Rightarrow 3 / 2 = d \Rightarrow 3/2 = d \Rightarrow d = 3/2$$

Si multiplicamos todos los coeficientes por dos para eliminar las fracciones:

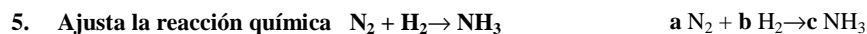
$$a = 1 \cdot 2 = 2$$

$$b = 3 \cdot 2 = 6$$

$$c = 1 \cdot 2 = 2$$

$$d = (3/2) \cdot 2 = 3$$

La ecuación ajustada queda: $2 \text{Al} + 6 \text{HCl} \rightarrow 2 \text{AlCl}_3 + 3 \text{H}_2$



N: $2a = c$

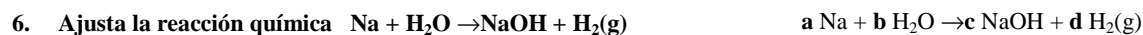
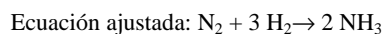
H: $2b = 3c$

Si hacemos que $c = 1$, tendremos:

$2a = 1 \Rightarrow a = 1/2$

$2b = 3 \cdot 1 = 3 \Rightarrow b = 3/2$

Multiplicando por dos, para que no haya coeficientes fraccionarios: $c=2, a=1, b=3$



Na: $a = c$

H: $2b = c + 2d$

O: $b = c$

Si le damos a c el valor 1: $c = 1$

$a = c \Rightarrow a = 1$

$b = c \Rightarrow b = 1$

Para calcular d $2b = c + 2d \Rightarrow 2 \cdot 1 = 1 + 2d \Rightarrow 2 = 1 + 2d \Rightarrow 2 - 1 = 2d \Rightarrow 1/2 = d \Rightarrow d = 1/2$

Multiplicamos por dos para eliminar coeficientes fraccionarios:

$a = 1 \cdot 2 = 2$

$b = 1 \cdot 2 = 2$

$c = 1 \cdot 2 = 2$

$d = (1/2) \cdot 2 = 1$

La reacción queda: $2 Na + 2 H_2O \rightarrow 2 NaOH + H_2(g)$

EJERCICIOS CON SOLUCIONES

$H_2 + O_2 \rightleftharpoons H_2O$	$2 H_2 + O_2 \rightleftharpoons 2 H_2O$
$N_2 + H_2 \rightleftharpoons NH_3$	$N_2 + 3 H_2 \rightleftharpoons 2 NH_3$
$H_2O + Na \rightleftharpoons Na(OH) + H_2$	$2 H_2O + 2 Na \rightleftharpoons 2 Na(OH) + H_2$
$KClO_3 \rightleftharpoons KCl + O_2$	$2 KClO_3 \rightleftharpoons 2 KCl + 3 O_2$
$BaO_2 + HCl \rightleftharpoons BaCl_2 + H_2O_2$	$BaO_2 + 2 HCl \rightleftharpoons BaCl_2 + H_2O_2$
$H_2SO_4 + NaCl \rightleftharpoons Na_2SO_4 + HCl$	$H_2SO_4 + NaCl \rightleftharpoons Na_2SO_4 + HCl$
$FeS_2 \rightleftharpoons Fe_3S_4 + S_2$	$3 FeS_2 \rightleftharpoons Fe_3S_4 + S_2$
$H_2SO_4 + C \rightleftharpoons H_2O + SO_2 + CO_2$	$2 H_2SO_4 + C \rightleftharpoons 2 H_2O + 2 SO_2 + CO_2$
$SO_2 + O_2 \rightleftharpoons SO_3$	$2 SO_2 + O_2 \rightleftharpoons 2 SO_3$
$NaCl \rightleftharpoons Na + Cl_2$	$2 NaCl \rightleftharpoons 2 Na + Cl_2$
$HCl + MnO_2 \rightleftharpoons MnCl_2 + H_2O + Cl_2$	$4 HCl + MnO_2 \rightleftharpoons MnCl_2 + 2 H_2O + Cl_2$
$K_2CO_3 + C \rightleftharpoons CO + K$	$K_2CO_3 + 2 C \rightleftharpoons 3 CO + 2 K$
$Ag_2SO_4 + NaCl \rightleftharpoons Na_2SO_4 + AgCl$	$Ag_2SO_4 + 2 NaCl \rightleftharpoons Na_2SO_4 + 2 AgCl$
$NaNO_3 + KCl \rightleftharpoons NaCl + KNO_3$	$NaNO_3 + KCl \rightleftharpoons NaCl + KNO_3$
$Fe_2O_3 + CO \rightleftharpoons CO_2 + Fe$	$Fe_2O_3 + 3 CO \rightleftharpoons 3 CO_2 + 2 Fe$
$Na_2CO_3 + H_2O + CO_2 \rightleftharpoons NaHCO_3$	$Na_2CO_3 + H_2O + CO_2 \rightleftharpoons 2 NaHCO_3$
$FeS_2 + O_2 \rightleftharpoons Fe_2O_3 + SO_2$	$4 FeS_2 + 11 O_2 \rightleftharpoons 2 Fe_2O_3 + 8 SO_2$
$Cr_2O_3 + Al \rightleftharpoons Al_2O_3 + Cr$	$Cr_2O_3 + 2 Al \rightleftharpoons Al_2O_3 + 2 Cr$
$Ag + HNO_3 \rightleftharpoons NO + H_2O + AgNO_3$	$3 Ag + 4 HNO_3 \rightleftharpoons NO + 2 H_2O + 3 AgNO_3$
$CuFeS_2 + O_2 \rightleftharpoons SO_2 + CuO + FeO$	$CuFeS_2 + 3 O_2 \rightleftharpoons 2 SO_2 + CuO + FeO$