Name : _____ Date : _____

Hess's Law Worksheet

1. The algebraic formula for Hess's law is ___

A. $\Delta H = \Delta H_1 + \Delta H_2 + \Delta H_3 + \ldots$

B. $\Delta H = \Delta H_1 - \Delta H_2 - \Delta H_3 - \ldots$

C. $\Delta H = \dfrac{(\Delta H_1 \times \Delta H_2 \times \Delta H_3 \times \ldots.)}{(\Delta H_1 + \Delta H_2 + \Delta H_3 + \ldots.)}$

D. $\Delta H = \Delta H_1 \times \Delta H_2 \times \Delta H_3 \times \ldots$

2. Find the ΔH for the reaction below, given the following reactions and subsequent ΔH values.

$$2\ Al\ (s) + 3\ Cl_2\ (g) \longrightarrow 2\ AlCl_3\ (s)$$

$2\ Al\ (s) + 6\ HCl\ (aq.) \longrightarrow 2\ AlCl_3\ (aq.) + 3\ H2\ (g)$ $\quad \Delta H = -1049$ kJ

$HCl\ (g) \longrightarrow HCl\ (aq.)$ $\quad \Delta H = -74.8$ kJ

$H_2\ (g) + Cl_2\ (g) \longrightarrow 2\ HCl\ (g)$ $\quad \Delta H = -1845$ kJ

$AlCl_3\ (s) \longrightarrow AlCl_3\ (aq.)$ $\quad \Delta H = -323$ kJ

3. Calculate the ΔH for the reaction: $PbCl_2\ (s) + Cl_2\ (g) \longrightarrow PbCl_4\ (l)$

Given the following information:

$Pb\ (s) + 2\ Cl_2\ (g) \longrightarrow PbCl_4\ (l)$ $\quad \Delta H = -393$ kJ/mol

$Pb\ (s) + Cl_2\ (g) \longrightarrow PbCl_2\ (s)$ $\quad \Delta H = -359$ kJ/mol

Name : _____ Date : _____

Hess's Law Worksheet

Answers

1. The algebraic formula for Hess's law is A

A. $\Delta H = \Delta H_1 + \Delta H_2 + \Delta H_3 + \ldots$

B. $\Delta H = \Delta H_1 - \Delta H_2 - \Delta H_3 - \ldots$

C. $\Delta H = \dfrac{(\Delta H_1 \times \Delta H_2 \times \Delta H_3 \times \ldots.)}{(\Delta H_1 + \Delta H_2 + \Delta H_3 + \ldots.)}$

D. $\Delta H = \Delta H_1 \times \Delta H_2 \times \Delta H_3 \times \ldots$

2. Find the ΔH for the reaction below, given the following reactions and subsequent ΔH values.

$$2\ Al\ (s) + 3\ Cl_2\ (g) \longrightarrow 2\ AlCl_3\ (s)$$

$2\ Al\ (s) + 6\ HCl\ (aq.) \longrightarrow 2\ AlCl_3\ (aq.) + 3\ H2\ (g)$	ΔH = −1049 kJ
$HCl\ (g) \longrightarrow HCl\ (aq.)$	ΔH = -74.8 kJ
$H_2\ (g) + Cl_2\ (g) \longrightarrow 2\ HCl\ (g)$	ΔH = -1845 kJ
$AlCl_3\ (s) \longrightarrow AlCl_3\ (aq.)$	ΔH = -323 kJ
$2\ Al\ (s) + 6\ HCl\ (aq.) \longrightarrow 2\ AlCl_3\ (aq.) + 3\ H_2\ (g)$	ΔH = −1049 kJ
$6\ HCl\ (g) \longrightarrow 6\ HCl\ (aq.)$	ΔH = -448.8 kJ
$3\ H_2\ (g) + 3\ Cl_2\ (g) \longrightarrow 6\ HCl\ (g)$	ΔH = -5535 kJ
$2\ AlCl_3\ (aq.) \longrightarrow 2\ AlCl_3\ (s)$	ΔH = +646 kJ
$2\ Al\ (s) + 3\ Cl_2\ (g) \longrightarrow 2\ AlCl_3\ (s)$	**ΔH = -6386.8 kJ**

3. Calculate the ΔH for the reaction: $PbCl_2\ (s) + Cl_2\ (g) \longrightarrow PbCl_4\ (l)$

Given the following information:

$Pb\ (s) + 2\ Cl_2\ (g) \longrightarrow PbCl_4\ (l)$	ΔH = -393 kJ/mol
$Pb\ (s) + Cl_2\ (g) \longrightarrow PbCl_2\ (s)$	ΔH = -359 kJ/mol
$Pb\ (s) + 2\ Cl_2\ (g) \longrightarrow PbCl_4\ (l)$	ΔH = -393 kJ/mol
$PbCl_2\ (s) \longrightarrow Pb\ (s) + Cl_2\ (g)$	ΔH = +359 kJ/mol
$PbCl_2\ (s) + Cl_2\ (g) \longrightarrow PbCl_4\ (l)$	**ΔH = -34 kJ/mol**