

ROAD MAP!!!!!!

gram gram
| |
mole ————— mole

gram
|
mole ——— kcal

gram gram
| |
mole ————— mole ——— kcal

Old One:

1. When 0.48 g of Na_2O_2 is dropped in water, $2 \text{Na}_2\text{O}_2 + 2 \text{H}_2\text{O} \rightarrow \text{O}_2 + 4 \text{NaOH}$
how many grams of O_2 are formed? (0.098 g O_2)

New Ones

2. The formation of nitrogen monoxide from its $\text{N}_2 + \text{O}_2 \rightarrow 2 \text{NO} \quad \Delta H = +43.2 \text{ kcal}$
elements is an endothermic process. How many
grams of NO can be formed using 2000 kcal? (2780 g NO)
3. The combustion of ethene, C_2H_4 , liberates 1390 kJ. $\text{C}_2\text{H}_4 + 3 \text{O}_2 \rightarrow 2 \text{CO}_2 + 2 \text{H}_2\text{O} \quad \Delta H = -1390 \text{ kJ}$
Calculate the amount of heat liberated with 1.87 g C_2H_4
reacts with excess oxygen. (-92.8 kJ)

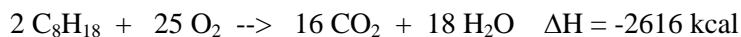
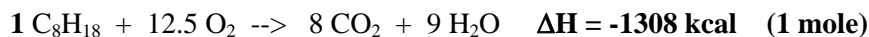
Mix and Match

4. How many grams of NO are formed when 18.2 g H_2S reacts with an excess of HNO_3 ? (10.7 g NO) $3 \text{H}_2\text{S} + 2 \text{HNO}_3 \rightarrow 2 \text{NO} + 4 \text{H}_2\text{O} + 3 \text{S}$
5. How many kJ of energy are needed for 7.3 moles of iron to react with an excess of CO_2 ? (96 kJ) $2 \text{Fe} + 3 \text{CO}_2 \rightarrow \text{Fe}_2\text{O}_3 + 3 \text{CO} \quad \Delta H = +26.3 \text{ kJ}$
6. How many grams of H_3PO_4 are needed to react with excess calcium carbonate to produce 3.74 grams of calcium phosphate? (2.36 grams) $3 \text{CaCO}_3 + 2 \text{H}_3\text{PO}_4 \rightarrow \text{Ca}_3\text{PO}_4 + 3 \text{CO}_2 + 3 \text{H}_2\text{O}$

Lets Learn Some Terminology While We Practice---You Need To Know The Following Terms

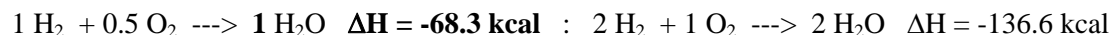
7. Term: **Heat of Combustion**---The energy released when **1 mole** of a substance burns. The heat of combustion for Octane (C₈H₁₈) is -1308 kcal.

Note: All C_xH_x and C_xH_xO_x compounds react with H₂O to form CO₂ and H₂O (page 91)



How many grams of octane, C₈H₁₈, must react to release 1.00 kcal? (0.0872 g)

8. Term: **Heat of Formation**--The energy released or absorbed when **1 mole** of a compound forms **from elements**. The heat of formation for H₂O is -68.3 kcal.



How many kcal of energy are released when 16.0 grams of Hydrogen are reacted with Oxygen? (-541 Kcal)

9. Term: **Heat of Fusion (H_{fus})**--The energy transferred when **1 mole** of a substance **melts** or **freezes**



How many kcal of energy are required to melt 75.0 g of ice (H₂O_(s))? (+5.99 kcal)

10. Term: **Heat of Vaporization (H_{vap})**--The energy transferred with **1 mole** of a substance **boils** or **condenses**.



How many grams of steam are condensed to transfer 37.5 kcal of energy to your skin? (69.5 g)

11. Writing equations. Potassium reacts with Oxygen. How many grams of Potassium are required to produce 134 grams of the product potassium oxide? (111 g K)

Eq: _____