

Enthalpy Stoichiometry

Chem Worksheet 16-3

Name _____

The **molar enthalpy of reaction** (ΔH_{rxn}) is the amount of heat transferred during a reaction. It is reported in kilojoules per mole of reactant. A reaction that produces heat is **exothermic** and has a negative ΔH_{rxn} . A reaction that absorbs heat is **endothermic** and has a positive ΔH_{rxn} .

Example

How much heat is produced when 85 g of sulfur reacts according to the reaction below?



- the ΔH value given in the equation is the amount of heat transferred when **2 moles** of sulfur and **3 moles** of oxygen react.

- write the 'given' and 'unknowns' units: $\frac{85 \text{ g S}}{1} \times \frac{1 \text{ mol S}}{32.06 \text{ g S}} \times \frac{-792 \text{ kJ}}{2 \text{ mol S}} = \text{kJ}$

- fill in factors: $\frac{85 \text{ g S}}{1} \times \frac{1 \text{ mol S}}{32.06 \text{ g S}} \times \frac{-792 \text{ kJ}}{2 \text{ mol S}} = \text{kJ}$

- solve: $\frac{85 \text{ g S}}{1} \times \frac{1 \text{ mol S}}{32.06 \text{ g S}} \times \frac{-792 \text{ kJ}}{2 \text{ mol S}} = -1050 \text{ kJ}$

Answer the following questions. Show all work and report answers with units.

1. How much heat will be released when 6.44 g of sulfur reacts with excess O_2 according to the following equation?



2. How much heat will be released when 4.72 g of carbon reacts with excess O_2 according to the following equation?



3. How much heat will be absorbed when 38.2 g of bromine reacts with excess H_2 according to the following equation?



4. How much heat will be released when 1.48 g of chlorine reacts with excess phosphorus according to the following equation.



5. What mass of propane, C_3H_8 , must be burned in order to produce 76,000 kJ of energy?



6. How much heat will be absorbed when 13.7 g of nitrogen reacts with excess O_2 according to the following equation?



7. What mass of iron must react to produce 3600 kJ of energy?



8. How much heat will be released when 12.0 g of H_2 reacts with 76.0 g of O_2 according to the following equation? (when one reactant runs out the reaction stops)



Enthalpy Stoichiometry 16 3

Kenneth Wark



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jan 7 2022 the design of a low profile high gain substrate integrated waveguide siw cavity backed slot antenna operating in the frequency band of 8 08 8 33 ghz is achieved by using the mtm in the superstrate the peak realized gain of the proposed antenna is 8 22 dbi which is 96 5 of the maximum attainable gain obtained from the harrington limit

chalmers publication library - Nov 11 2022

abstract a wideband 2 2 slot element for a 60 ghz antenna array is designed by making use of two double sided printed circuit boards pcbs the upper pcb contains the four radiating cavity backed slots where the cavity is formed in substrate integrated waveguide siw using metalized via holes

low profile hexagonal siw cavity slot antenna with enhanced gain - Jan 13 2023

apr 3 2020 a novel low profile substrate integrated waveguide siw cavity backed slot antenna with an enhanced gain is

proposed by etching four parallel transverse slots at the edges of the hexagonal siw cavi

development of a wideband hexagonal siw cavity backed slot antenna - Aug 20 2023

sep 1 2021 in this paper a novel wideband hexagonal cavity backed slot antenna array waveguide siw is proposed first a single element low profile wideband linearly polarized cavity backed antenna using two slots is designed and analyzed the antenna bandwidth is increased by nrws which makes both hybrid modes of tm input impedance keywords

a high performance siw slot antenna array for mmwave radar - May 17 2023

jul 24 2023 the feed network of the antenna is composed of an air filled rectangular waveguide rwg to substrate integrated waveguide siw transition and a power division feed network finally the array element and the feed network are combined to form an 8 times 16 slot array the overall simulation design is carried out in hfss