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C o2 co2 heat of reaction

The changes of enthalpies for many types of chemical and physical processes are available in the reference literature, including those for combustion reactions, phase transitions and formation reactions. As we discuss these quantities, it is important to pay attention to the extensive nature of enthalpy and enthalpted changes. Once the change of enthalpy for a certain reaction is proportional to the quantities of substances involved, it may be reported on that basis (ã® "H for specific quantities of reagents) . However, we often find it more useful to divide an extensive property ("h) by another (quantity of substance), and report an intensive value for H value, often" normal "the soft base. (Note that this is similar to determine the specific heat of the intensive property of the extensive heat capacity of the property, as seen earlier.) A standard state is a common set of conditions used as a reference point for determining Properties under other different conditions. For chemicals, the standard IUPAC state refers to materials under a 1-bar pressure and 1 m solutions, and does not specify a temperature (also used). Many thermochemical tables list values with a standard status of 1 Available. Because the one of a reaction changes very little with such small changes in the pressure (1 bar = 0.987 atm), the values H (except the most precisely measured values) are essentially the same in both Set sets of standard conditions. We will include a "O" superscript, in the symbol of enthalpy change to designate the standard state. As the usual temperature (but not technically standard) is 298.15 K, we will use a subscript "298" to designate this temperature. Thus, the symbol (\ (\ (\ (\ (\ (\ (\ (\ (\ (H-\ Circ_ {298 \)) is used to indicate an entry change to a process occurring under these conditions. (Symbol ah is used to indicate A change of enthalpy for a reaction occurring under conditions not standard.) Enthalpia of the combustion pattern (\ (\ (\ (h_c \ c circle \)) It is the change of enthalpy when 1 mole of a burning substance (combines vigorously with oxygen) under standard status conditions; Sometimes is called "Heat of Combion. For example, the Ethanol combustion, "1366.8 kJ / mol, is the amount of heat produced when a soft ethanol undergoes a complete combustion at 25 °. C and 1 atmosphere pressure, producing products Also 25 ° C and 1 ATM. \ [\ CE {C2H5OH} (L) + \ CE {3O2} (G) \ \ \ CE {2CO2} + \ CE {3H2O} (L) \ Hspace {20px} {298} ^ \ CIRC = \ Mathrm {Â ¢ 1366.8 \: KJ \] Combation enthalpies for many substances were measured; some of these are listed in table \ (\ Pamaintex {1} \). Many substances readily available with large combustion enthusiasts are used as fuel, including hydrogen, carbon (such as carbon or carvano) and hydrocarbons (compounds containing only hydrogen and carbon), such as methane, propane and the main components of gasoline. Table \ (\ Prabeindex {1} \): Combination-standard combination molar entals of combustion combination ENTALPY \ (" Mathrm {\ dfac {kj} {mol} \: \: 25 ° C \ right) \ (\ CE {C} + \ CE {O2} (g) \ \ \ CE {CO2} (g) \ (\ CE {H2} (g) + \ frac {1} {2} \ CE {O2} (g) \ \ \ CE {H2O} (L) \) \ 285.8 Magnetic \ (\ CE {MG} + \ frac {1} {2} \ CE {O2} (g) \\ \ \ {MGO}}} \,601.6 sulfur \ (\ CE {S} (s) + \ CE {S} + \ CE} O2} (g) \ \ \ CE {SO2} (g) \) \ 296.8 carbon monoxide \ (\ CE {CO} (G) + \ frac {1} {2} \ CE {2} (g) \ \ \ CE {CO2} (g) \) \ 283.0 methane \ (\ CE {CH4} (g) + \ CE {2O2 } (g) \ \ CE {CO2} (g) + \ CE {2H2O} (1) \ 890.8 acetylene \ (\ CE {C2H2} (g) + \ Dfrac {5} {2} \ CE {O2} (g) \ \ \ CE {2CO2} (g) + \ CE {H2O} (L) \) \ 1301.1 ethanol \ (\ CE {C2H5OH} (L) + \ CE {3O2}) \ \ \ CE {CO2} (g) + \ CE {3H2O} \) \ 1366.8 methanol \ (\ CE {CH3OH} (1) + \ Dfrac {3} {2} \ CE (g) \ \ CE {CO2} (g) + \ CE {2H2O} \) \ 726.1 isooctane \ (\ CE {C8H18} (L) + \ Dfrac {25} {2} \ O2} (g) \} CE {8CO2} (g) + \ CE {9H2O} (L) \) \ 5461 Example \ (\ pataintex {3} \): using combustion enthalpy as figure \ (\ Pataintex \ \) suggests, gasoline combustion is a highly exotheremic process. Let's determine the Amount of heat produced by the burning of 1.00 L of gasoline, assuming that the enthalption of gasoline combustion is the same as that of ISO-octane, a common component of gasoline. Isooctane density is 0.692 g / ml. The figure \ (\ paiveindex {3} \): the gasoline combustion is very exotic. (Crédo said: working modification by an alexeaglez ¢ / flickr) Solution starting with a known amount (1,00 L of ISO-octane), we can make conversions between units to reach Desired amount of heat or energy. The isooctane combustion enthalpy provides one of the necessary conversions. Table \ (\ \ paiveindex {1} \) Give this value as a 5460 kJ per 1 mole of ISO-octane (C8H18). Using this data, \ [\ Mathrm {1.00 \: \ Cancel {G \: \ CE {C8H18}} \ Dfrac {1000 \: \ Cancel {ML \: \ CE {C8H18}}} {1 \ : \ Cancel {G \: \ CE {C8H18}}} \ Dfrac {0.692 \: \ Cancel {G \: \ CE {C8H18}}} {1 \: \ Cancel {ML \: \ CE {ML \: \ CC }}} \ Dfrac {1 \: \ Cancel {Mol \: \ CE {C8H18}}} {114}} {G \: \ CE {C8H18}}} ~ Dfrac {A 5460 \: KJ} {1 \: \ Cancel {Mol \: \ CE {C8H18}}} = A 3.31Ãƒ 10 ^ 4 \: KJ} Onumber \] The combination of 1,00 L of isooctano produces 33,100 kJ of heat. (This amount of energy is enough to melt 99.2 kg, or about 218 pounds, ice.) Note: If you do this calculation one step at a time, you would find: \ (\ Begin {* ALIGN} e \ Mathrm {1.00 \: g \: \ CE {C8H18} ~ \¶1.00} \: \: ml \: \ CE {C8H18}} \\ & \ Mathrm {100A 10 : ml \: \ ce {C8H18} ~ ~692 \: g \: \ CE {C8H18}} \\ mathrm {692 \: G \: \ CE {C8H18} ~ £6.07 \: Mol \: \ CE {C8H18}} \\ & \ Mathrm {692 \: g \: \ CE {C8H18} Ã ~a 3.31Ãƒ 10 ^ 4 \: KJ} \ final {align *} \) Exercise \ (\ Paiveindex {3} \) How the amount of heat produced by the combination of 125 g of acetylene? Answer 6.25 to 103 KJ emerging algae energy-based technologies (biofuels) As fuel fuel reserves decrease and become more expensive to extract, the search is ongoing for substitution fuel sources for the future. Among the most promising biofuels are those derivatives from algae (figure \ (\ paiveindex {4} \)). The spaces of algae used are not the non-turbine, biodegradable, and between the most fast growing organisms of the world. About 50% weight of algae is oil, which can be promptly converted into fuel, such as biodiesel. Algae can produce 26,000 biofuels of biofuels per hectarea much more energy by acre than other cultures. Some strains of algae can flourish in salobas water that is not useful for the cultivation of other cultures. Algae can produce biodiesel, biogoline, ethanol, butanol, methane, and same jet fuel. Figure \ (\ paiveindex {4} \): (a) Algae organisms can be minor (b) cultured in large quantities and eventually (C), became a useful fuel, such as biodiesel. (Criterion: The modification of work by Micah Sittig; Crédio B: The modification of the work of Robert Kerton; Crédio C: Modification of the work of John F . Williams) According to the US Department of Energy, only 39,000 square kilometers (about 0.4% of the US land mass or less than \ (\ Dfrac {1} {7} \) Rea used for corn cultivation) can produce enough algae fuel to replace all fuel from the oil base used in the USA. The cost of algae fuels is becoming more competitive ¢ for example, the US Aerial Force is producing fuel from algae, at a total cost of less than US $ 5 Galão. The process used for algae fuel production is as follows: to grow algae (which use sunlight as a source of energy and CO2 as a raw material); Spoon algae; extract fuel compounds (or precursor compounds); process as necessary (for example, carry out a transesterification reaction transform biodiesel); purify; and distribute (figure \ (\ \ paiveindex {5} \)). The figure \ (\ paiveindex {5} \): algae convert the sunlight and dioxide from carbon into oil which is collected, extracted, purified and used to transform a variety of renewable fuels. The pattern of standard formation \ (A-H \ CIRC_ \ CE {f} \) is an enthalpy variation for a reaction at which exactly a mole of a Pure substance is formed from free elements in their most stable states under the standard status conditions. These values are especially osible to calculate or predict the enthalpy changes for the chemical reactions that are impractical â € œ

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