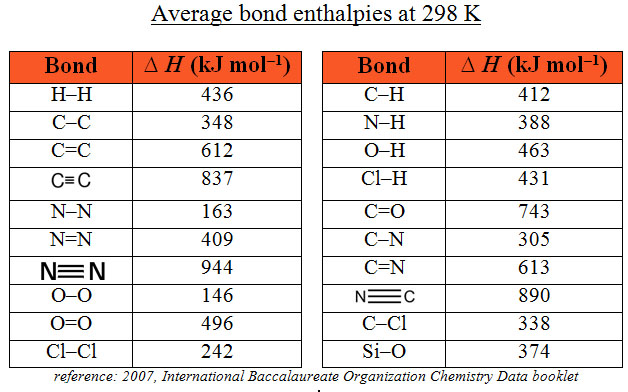
**Additional questions on bond enthalpy**

**

**1. Calculate the energy change for this reaction: CH2CH2(g) + 3O2(g) 🡪 2CO2(g) + 2H2O(g)**

**2. Use the Haber process equation to calculate the average bond enthalpy value for the N–H bond**

**N2(g) + 3H2(g) 🡪 2NH3(g)** ∆rH = -92 kJmol-1

|  |  |
| --- | --- |
| **3.** Calculate the energy change for photosynthesis  6CO2(g) + 6H2O(l) 🡪 C6H12O6(s) + 6O2(g)  The structure of glucose is shown below | **[http://t0.gstatic.com/images?q=tbn:ANd9GcT3IWGI9Lj0xRQA_0CYFH779gHIaEVuXMD-ro2DNuuNv-W1U8nqqA](http://www.google.co.nz/imgres?q=glucose+molecule&hl=en&gbv=2&biw=1024&bih=476&tbm=isch&tbnid=VurAY3J7IYLEcM:&imgrefurl=http://www.crsbooks.net/appendix.html&docid=k_yXFRK8fm5pOM&imgurl=http://www.crsbooks.net/images/c1.gif&w=358&h=319&ei=UsQcT-aqFsGiiAe6mrmjDQ&zoom=1)** |

**4.** Hydrazine was first used as a rocket fuel during World War II. The equation below shows the combustion of hydrazine, use it and the bond enthalpy values to calculate the energy change for this reaction.

N2H4(l) + O2(g) 🡪 N2(g) + 2H2O(l)



**5.** Calculate the heat of reaction for the combustion of butane when completely burned in oxygen

**6.** Carbon monoxide can be formed from the reaction of methane gas with steam. The following endothermic

reaction absorbed 206kJmol-1 of energy,

Calculate the bond enthalpy for the C≡O bond in carbon monoxide.

CH4(g) + H2O 🡪 CO(g) + 3H2(g) ∆rH = +206 kJmol-1

**7.** Use the bond enthalpy values in the table above and these values S-S 264kJmol-1 and S=S 352kJmol-1 to suggest a reason why 8 sulfur atoms tend to form one S8 molecule whereas 8 oxygen atoms tend to form four O2 molecules.

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