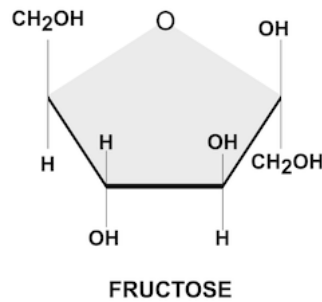


Homework 2

Structure and the reaction of formation of fructose from CO_2 and H_2O is given below:



- Estimate the enthalpy of the above reaction for the formation of fructose based on the above structure using the bond enthalpies. ($\Delta_{\text{vap}}H^\theta (\text{H}_2\text{O}) = 44 \text{ kJ / mol}$, $\Delta_{\text{vap}}H^\theta (\text{fructose}) = 117,93 \text{ kJ / mol}$, $\Delta_{\text{fus}}H^\theta (\text{fructose}) = 22.77 \text{ kJ / mol}$; for bond enthalpies use the table given) (10 points)
- Estimate the enthalpy of formation of fructose using standard enthalpy of formation of the reactants and products. ($\Delta H_f (\text{CO}_2) = -393.51 \text{ kJ/mol}$, $\Delta H_f (\text{H}_2\text{O}) = -285.83$) (7 points)
- Estimate the standard enthalpy of combustion of fructose without performing any calculation. (3 points)

Bond Energies (kJ/mol)

Bond	Bond Energy		Bond	Bond Energy		Bond	Bond Energy
H-N	390		C-Br	275		Si-Si	230
H-O	464		C-I	240		Si-P	215
H-F	569		N-N	160		Si-S	225
H-Si	395		N = N	418		Si-Cl	359
H-P	320		N \equiv N	946		Si-Br	290
H-S	340		N-O	200		Si-I	215
H-Cl	432		N-F	270		P-P	215
H-Br	370		N-P	210		P-S	230
H-I	295		N-Cl	200		P-Cl	330
C-C	345		N-Br	245		P-Br	270
C = C	611		O-O	140		P-I	215
C \equiv C	837		O = O	498		S-S	215
C-N	290		O-F	160		S-Cl	250
C = N	615		O-Si	370		S-Br	215
C \equiv N	891		O-P	350		Cl-Cl	243
C-O	350		O-Cl	205		Cl-Br	220
C = O	741		O-I	200		Cl-I	210
C \equiv O	1080		F-F	160		Br-Br	190
C-F	439		F-Si	540		Br-I	180
C-Si	360		F-P	489		I-I	150
C-P	265		F-S	285			