LECTURE 15

1. Using the following bond enthalpy table, calculate the estimated enthalpy of reaction for the following reaction:

$N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$

N-N	163 kJ/mol	N-H	391 kJ/mol
N=N	418 kJ/mol	H-H	436 kJ/mol
N≡N	941 kJ/mol		

ΔH_{rxn} = -97 kJ/mol

2. The anaerobic conversion of sucrose ($C_{12}H_{22}O_{11}$) to lactic acid ($CH_3CH(OH)COOH$) is shown in equation (1). The combustion of sucrose is shown in equation (2).

(1) $C_{12}H_{22}O_{11} + H_2O \rightarrow 4CH_3CH(OH)COOH$
(2) $C_{12}H_{22}O_{11} + 12O_2 \rightarrow 12CO_2 + 11H_2O$

Calculate the standard reaction enthalpy for each reaction using the following enthalpy of formation data: $\Delta H_f°$= -694 kJ/mol for lactic acid, $\Delta H_f°$= -2222 kJ/mol for sucrose, $\Delta H_f°$= -393.5 kJ/mol for CO_2, $\Delta H_f°$= -286 kJ/mol for H_2O.

$\Delta H_{r(1)}°$ = -268 kJ (or kJ/mol)
$\Delta H_{r(2)}°$ = -5646 kJ (or kJ/mol)

Additional Book Problems:
Atkins and Jones, Chemical Principles, fourth edition:
Chapter 6, Self-Test 6.18A&B, problem 6.62 & 6.63, 6.86 & 6.87

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