

## Classroom Exercises, Lectures 7, 8

### Example 1.

With  $C_{v,m} = 3/2R$ ; one mole of an ideal monatomic gas undergoes a reversible process in which its volume is doubled and in which 1.00 kJ of heat is absorbed by the gas. Initial pressure is 1.00 bar, initial temperature is 300 K. Calculate final pressure and final temperature as well as  $\Delta U$  and  $w$ .  $\Delta H$  for the process is 1.50 kJ.

### Example 2.

A gas that behaves ideally was allowed to expand reversibly and adiabatically to 2X its volume. Its initial temperature was 25.0 °C and its  $C_{v,m} = 5/2R$ . Calculate  $\Delta U_m$ ;  $\Delta H_m$  for this process.

Enthalpy Notes:

- (a) Enthalpy is a state function
- (b) Thus enthalpy changes are additive
- (c) Enthalpy changes are extensive properties
- (d) For a chemical reaction, enthalpy is also dependent on the extent of reaction,  $\zeta$

Standard State:

A standard state of a substance at a specified temperature is its pure form at 1.00 bar.

### Hess Law:

The standard enthalpy change of an overall reaction is the sum of the standard enthalpies of the individual reactions into which the overall reaction may be divided.

### Example 3

Enthalpy changes for the complete combustion of d-glucose and maltose at 298.15 K are -2809.1 and -5645.5 kJ respectively. Calculate the enthalpy change accompanying conversion of 1.00 mole of glucose to maltose:

