Chemistry CP

Name:

Energy in Changes of State: Level 2

Section:

Use the following constants in your problems:
C_p(ice) = 2.077 J /g ^oC
C_p(water) = 4.180 J /g ^oC
C_p(water vapor) = 2.042 J /g ^oC
ΔH_{fus} = 6.00 kJ/mol= 333 J/g
ΔH_{vap} = 40.6 kJ/mol = 2254 J/g

Strategy:
Draw a diagram
Calculate each change
Qtot = Q1 + Q2 +…

1. A 103 g sample of liquid water at 22^{o}C is cooled to 0^{o}C and frozen. Calculate the number of joules removed.

2. How much energy in joules is required to heat 7.65 g of liquid water at 42.0^{o}C to water vapor at 100^{o}C?

3. A 55.6 g sample of water at 19.2^{o}C is cooled to ice at –3.50^{o}C. How many kilojoules are released?

4. How much heat in joules is lost when 12.4 g of $H_2O(g)$ at 110.^{o}C are converted to liquid at 50^{o}C?

5. Calculate the energy required in kJ to bring 293 g of liquid water at 62.0^{o}C to steam at 105.0^{o}C.

6. A 23 g sample of ice at –20.0^{o}C is heated to water vapor at 102^{o}C. Calculate the amount of energy (in joules) required.