

1) Calculate the total heat in joules needed to convert 22.00g of ice at -6.00 degrees celsius to liquid water at 0.500 degree celsius.

Melting point at 1 atm: 0.0 C

ΔH_{fus} = 6.02 kJ/mol

C_{solid} : 2.09 J/g *(C°)

C_{liquid} : 4.21 J/g *(C°)

2) How much total energy (in kJ) is required to heat the 25.0 g sample of benzene from 5.0 °C to 100.0 °C?

C_{solid} : 1.51 J/g *(°C)

C_{liquid} : 1.71 J/g *(°C)

C_{gas} : 1.10 J/g *(°C)

Melting point: 5.5°C

Boiling point: 80.1°C

ΔH_{fus} : 9.87 kJ/mol

ΔH_{vap} : 30.8 kJ/mol

3) Calculate the total energy change when 0.32mol of liquid ethanol at 25°C is converted to gaseous ethanol at 95.2°C

C_{gas} : 78.28J/mol(K)

C_{liquid} : 112.4J/mol(K)

Boiling point: 78.4°C

ΔH_{vap} : 38.56 kJ/mol

4) How much heat is released when 10.0g of steam at 125°C is cooled completely into ice at 0.0°C ?

C_{liquid} : 4.184 J/g * $(^{\circ}\text{C})$

C_{gas} : 2.01 J/g * $(^{\circ}\text{C})$

Melting point: 0.0°C

Boiling point: 100.0°C

ΔH_{fus} : 6.01 kJ/mol

ΔH_{vap} : 40.7 kJ/mol

5) The vapor pressure of diethyl ether is 400.0 mmHg at 17.9°C and 760.0 mmHg at 34.6°C . Assuming ideal behavior, calculate the enthalpy of vaporization (ΔH_{vap}) for diethyl ether in kJ/mol.