

Thermochemistry Worksheet

Specific Heat Values (J/g°C)

Substance	Specific Heat (c)	Substance	Specific Heat (c)
Ti	0.5226	C ₆ H ₅ CH ₃	1.80
C ₆ H ₆	1.74	Kerosene	2.09
Al	0.9025	Chalk	0.920
Au	0.12905	Glass	0.753
CH ₃ COOH	2.05		

H₂O K_{vap} = 540 cal/g

H₂O K_{fus} = 80 cal/g

Compute the energy changes associated with the following transitions.

- 1) Melting 55.8 g Ti at 1666 C°. (K_f = 14.146 kJ/mol)
 - 2) Condensing 14.2 g H₂O at 100.0 C°
 - 3) Boiling 53.5 g C₆H₆, benzene, at 80.1 C°. (K_v = 2.53 kJ/mol)
 - 4) Freezing 27.3 g Al at 660 C° (see below)
 - 5) Melting 76.4 g Au at 1064 C° (K_f = 12.4 kJ/mol)
 - 6) Heating 49.2 g acetic acid, CH₃COOH, from 24.1 C to 67.3 C°.
 - 7) Heating 9.61 g toluene, C₆H₅CH₃, from 19.6 C° to 75.0 C°.
 - 8) Heating 2.47 g kerosene from 17.1 C° to 46.7 C°
 - 9) Cooling 31.9 g chalk from 83.2 C° to 55.5 C°
 - 10) Cooling 63.6 g glass from 95.5 C° to 42.3 C°
11. How much energy is released when 42.5g of aluminum vapor are cooled from 4750 C° to 25 C°? (5 steps)

Freezing Point of Al = 660.0 C°

Boiling Point of Al = 2467 C°

K_{vap} = 10.8 kJ/g

K_{fus} = 396 J/g

c_(g) = .251 cal/g°C

c_(l) = 0.208 cal/g°C

c_(s) = .191 cal/g°C

12. In a closed, insulated system, ice is floating in water. The temperature is 0 °C. Will all of the water freeze?
13. Water is boiling at 100 °C. The hot plate's surface temperature is increased. Will the water now boil at a higher temperature?