Large c vs. small c

toast v. cocoa
seasons in Philly v. Minnesota
resorts near water
growing grapes near water
warmth of Europe

How much heat is used to warm 254 g of water from 18.3°C to 94.6°C?

$q = m c \Delta T$ ← $T_f - T_i$

$q = (254\,g)\left(1\,\frac{cal}{g\,°C}\right)(76.3\,°C)$

$= 19400\ cal$

ΔT + T ↑

q in

endothermic

ΔT − T ↓

q out

exothermic

18.6g of a metal at 94°C are dropped into 250.0g of water at 5.5°C. If the final temperature is 9.3°C, what is the specific heat of the metal?

$q_m = q_{H_2O}(-1)$ (ex = m, endo = H_2O)

$m_m c_m \Delta T_m = m_{H_2O} c_{H_2O} \Delta T_{H_2O} (-1)$

$\Delta T_m = (9.3 - 94) = -84.7$

$\Delta T_{H_2O} = (9.3 - 5.5) = 3.8$

A 17.8 g sample of a metal (c=0.051 cal/g°C) at 13.9°C is dropped into 180.0g of water at 94°C. What is the final temperature of the water?

$(-1)\, q_m = q_{H_2O}$

$(-1)(m_m c_m \Delta T_m) = m_w c_w \Delta T_w$

$(x - 13.9)$ $\quad (x - 94)$

$0 = m_w c_w \Delta T_w + m_m c_m \Delta T_m$

$0 = (180)(1)(x - 94) + (17.8)(.051)(x - 13.9)$

94°C

Phase changes

$q = m \Delta H_{vap}$ or fus

$l-g$ $l-s$