W-GC General Chemistry 5/4

$$1\ C_3H_8(g) + 5\ O_2(g) \longrightarrow 3CO_2(g) + 4\ H_2O(l)$$

Heat of Reaction at STP

$\Delta H = -2219.2\ kJ/mol$

4.5 g of C_3H_8

$$4.5\ g\ C_3H_8 * \frac{1\ mol\ C_3H_8}{44.097\ g\ C_3H_8} * \frac{-2219.2\ kJ}{mol}$$

$$= 226.5\ kJ$$

226.5 kJ into 5 kg of water

$$\frac{q}{mc} = \frac{mc\Delta T}{mc}$$

$$\frac{q}{mc} = \frac{226.5\ kJ}{5(4.184\ kJ/g\cdot°C)}$$

$\Delta T = 10.8\ °C$

$c = 1\ kcal/g\cdot°C$ or $c = 4.184\ kJ/g\cdot°C$

Calorimetry

Find the energy required to raise 28 g of water from 18°C to 89°C.

$q = mc\Delta T$

c = specific heat

1 cal/g·°C

or

4.184 J/g·°C

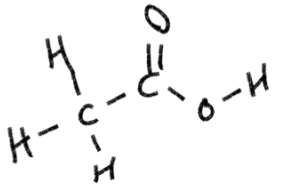
28 g = 28 mL

$(28\,g)(4.184\,J/g\cdot{}^\circ C)(89-18)^\circ C$

$(28\,g)(4.184\,J/g\cdot{}^\circ C)(71^\circ C)$

8317.8 J or 8.32 kJ

acetic acid



$C_2H_4O_2$

vinegar is 5% acetic acid

+ $NaHCO_3$ (sodium bicarbonate)

baking soda

molar mass

→ sodium acetate + H_2O + CO_2

50 mL or 100 mL of vinegar