Thermochemistry

↳ heat & temperature

study of the flow of heat in chemical reactions

particles are always moving

temperature is a measurment of the kinetic energy of particles

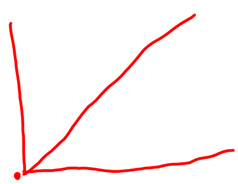
heat = energy

10 g H_2O 100 g H_2O

temperature - measure of the degree of hotness (°C, °F, K)

$°F = 1.8(°C) + 32$

$K = °C + 273$



0

0 K = absolute 0, particles stop moving

① 25°C = <u>298</u> K $K = 25° + 273$

② 25°C = <u>77°</u> F $F = 1.8(25C) + 32$

③ -10°C = <u>263</u> K $K = -10° + 273$

④ 0K = <u>-273</u> °C $°C = K - 273$ $= 0 - 273$

⑤ 98.6°F = <u>37</u> °C $°C = \frac{F-32}{1.8}$

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heat measured in calorie (cal)
kilocalorie (kcal)
Joule (J)
kilojoules (kJ)

1 cal = 4.18 J

① 150 kcal to cal

$$x \text{ cal} = 150 \text{ kcal} \times \frac{1000 \text{ cal}}{1 \text{ kcal}} = 150000$$

② 200 J to kJ

$$x \text{ kJ} = 200 \text{ J} \times \frac{1 \text{ kJ}}{1000 \text{ J}} = .2 \text{ kJ}$$

③ 45.5 cal to kJ

$$x \text{ kJ} = 45.5 \text{ cal} \times \frac{4.18 \text{ J}}{1 \text{ cal}} \times \frac{1 \text{ kJ}}{1000 \text{ J}}$$

.190 kJ

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enthalpy - heat content

entropy - state of disorder

substances like to have the lowest amount of energy (enthalpy) and highest amount of disorder (entropy)

<u>specific heat capacity</u>

different substances require different amounts of energy to raise temp

J/g°C

$C_p = \frac{q}{m \Delta T}$

$q = mC_p\Delta T$

q = quantity of heat (J)

m = mass (# of particles) (g)

Cp = specific heat capacity (J/g°C)

ΔT = change in temperature (°C)

$q = g \times \frac{J}{g°C} \times °C$

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