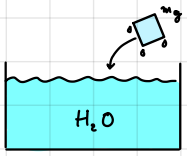
ESERCITAZIONE

ESERCIZIO 2



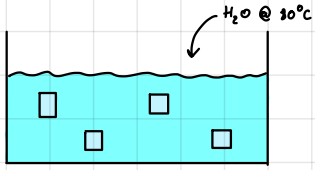
$V_{H_2O} = 500\ cm^3$ $\quad t_i = 20°C$ $\quad \lambda_g = 80\ cal/g$ $\quad m_g\ ?$

$t_F = 0°C$ $\quad c_a = 1\ cal/g°C$

$\rho_a = 10^3\ Kg/m^3 = 1\ g/cm^3$

$$\lambda_F m_g = c_a \rho_a V_{H_2O} (20°C - 0°C) \rightarrow m_g = \frac{c_a \rho_a V_{H_2O} \cdot 20°C}{\lambda_f} = 125\ g$$

ESERCIZIO 3



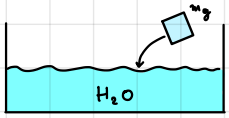
$m_a = 300g$ $\quad m = 1100g$ $\quad t = 80°C$ $\quad t_f\ ?$

$m_g = 600g$

$$c_a\, m\, (t - t_{eq}) = \lambda_f m_g + c_a (m_a + m_g) t_{eq} \rightarrow t_{eq}[c_a(m_a + m_g) + c_a m] = c_a m t - \lambda_F m_g \rightarrow t_{eq} = \frac{c_a m t - \lambda_f m_g}{c_a(m_a + m_g) + c_a m} = 20°C$$

$-Q_m = Q_{fg} + Q_{a\Delta t} + Q_{g\Delta t}$

ESERCIZIO 4



$V = 1L$ $\quad t_a = 25°C$ $\quad t_{eq}\ ?$

$m_g = 0{,}1\ Kg$ $\quad t_g = -20°C$

$m_g' = 0{,}5\ Kg$

$Q_{a\Delta t} = c_a m_a (0°C - t_a) = \ldots = -1{,}05 \cdot 10^5\ J$

$Q_{g\Delta t} = c_g m_g (0°C - t_g) = \ldots = 4{,}10 \cdot 10^3\ J$

$Q_{fg} = \lambda_{fg} m_g = \ldots = 3{,}35 \cdot 10^4\ J$

} servono per valutare se il ghiaccio si scioglie o no.

$\downarrow$

$|Q_{a\Delta t}| > Q_{g\Delta t} + Q_{fg}$ $\rightarrow$ l'acqua scioglie il ghiaccio senza arrivare a 0°

$\downarrow$

$$c_a m_a (t_a - t_{eq}) = \lambda_{fg} m_g + c_g m_g (t_{eq} - t_g) + \underbrace{c_a m_g (t_{eq} - 0)}_{\text{ghiaccio sciolto}} \rightarrow t_{eq} = \ldots = 14{,}56\ °C$$

Considerando m_g': $Q_{g\Delta t} = c_g m_g' (0°C - t_g) = \ldots = 2{,}05 \cdot 10^4\ J \rightarrow |Q_{a\Delta t}| < Q_{g\Delta t} + Q_{fg}$ $\rightarrow$ equilibrio di acqua e ghiaccio a 0°C

$Q_{fg} = \lambda_{fg} m_g' = \ldots = 1{,}68 \cdot 10^5\ J$

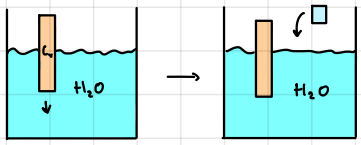
$\downarrow$

$-Q_{a\Delta t} = Q_{g\Delta t} + \Delta m_g \lambda_{fg}$

$\downarrow$

ghiaccio fuso (non è detto che tutto il ghiaccio fonda)

ESERCIZIO 5



c_x?, $\quad m_c = 2Kg$, $\quad T_c = 240°C$ $\quad m_g = 0{,}5\ Kg$ $\quad T_g = 0°C$

$V_A = 1\ dm^3$, $\quad T_a = 20°C$ $\quad T_{eq_2} = 25°C$

T_{eq_1}?

$$c_x m_c (T_c - T_{eq_1}) = c_a m_a (T_{eq_1} - m_A) \rightarrow T_{eq} = \frac{c_x m_c T_c + c_A m_A T_A}{c_A m_A + c_x m_c}$$

$$\lambda_{fg} m_g + c_a m_g T_{eq_2} = c_a m_a (T_{eq_1} - T_{eq_2}) + c_x m_c (T_{eq_1} - T_{eq_2}) \rightarrow \ldots \rightarrow c_x = \ldots = \ldots = 560\ J/Kg\,K$$

$\hookrightarrow T_{eq} = \ldots = 66{,}4\ °C$