

7. Energy given off by water + cup
 = Energy absorbed by ice + melting ice + ice water

$$Q = mc\Delta T$$

$$Q = m L_f$$

$$m_{H_2O} \cdot c_{H_2O} \cdot \Delta T_1 + m_{Al} \cdot c_{Al} \cdot \Delta T_1$$

$$= m_{ice} \cdot c_{ice} \cdot \Delta T_2 + m_{ice} \cdot L_{ice} + m_{ice} \cdot c_{H_2O} \cdot \Delta T_3$$

$$0,3 \cdot 4200 \cdot 10 + 0,15 \cdot 900 \cdot 10$$

$$= m_{ice} \cdot 2200 \cdot 10 + m_{ice} \cdot 334000 + m_{ice} \cdot 4200 \cdot 10$$

$$13950 = m_{ice} (2200 \cdot 10 + 334000 + 4200 \cdot 10)$$

$$13950 = 398000 m_{ice}$$

$$/ 398000$$

$$m_{ice} = 0,03505 \text{ kg} \approx \underline{\underline{35g}}$$

$$\Delta T_1 = 20^\circ\text{C} - 10^\circ\text{C} = 10\text{K}$$

$$c_{H_2O} = 4200 \text{ J kg}^{-1} \text{K}^{-1}$$

$$c_{Al} = 900 \text{ J kg}^{-1} \text{K}^{-1}$$

$$c_{ice} = 2200 \text{ J kg}^{-1} \text{K}^{-1}$$

$$L_{ice} = 334000 \text{ J kg}^{-1}$$

$$\Delta T_2 = 0^\circ\text{C} - (-10^\circ\text{C}) = 10\text{K}$$

$$\Delta T_3 = 10^\circ\text{C} - 0^\circ\text{C} = 10\text{K}$$

$$m_{H_2O} = 300\text{g} = 0,3 \text{ kg}$$

$$m_{Al} = 150\text{g} = 0,15 \text{ kg}$$

$$m_{ice} = ?$$