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Lab 3: Latent Fusion, 9/21/2023, Partner: Quency Snow

Part 1: Determine the latent heaf of fusion, L_F

1. $m_{w+d} = 0.343kg \pm 0.00005kg$
2. $T_h = 80.2°C \pm 3.5°C$
3. $T_f = 27.0°C \pm 0.1°C$
4. $m_{w+d+ice} = 0.5947kg \pm 0.00005kg \quad m_{ice} = 0.836kg \pm 0.00005$
5. $L_f = \frac{c_w m_w C_d}{m_{ice}}(T_h - T_f) + c_w(T_{ice} - T_f) = \frac{4186(0.1681)(83)}{0.0836}(80.2 - 27.0) + 4168(0 - 27.0) = \boxed{37053854.42}$
6. $$\delta L_f = \sqrt{\begin{matrix}\left(-m_{ice}^{-2}(c_w m_h + C_d)(T_h - T_f)\delta m_{ice}\right)^2 + \left(m_{ice}^{-1}(c_w T_{ice} - c_w T_f)\delta m_h\right)^2 \\ + \left(m_{ice}^{-1}(c_d T_{ice} - C_d T_f)\delta C_d\right)^2 + (c_w \delta T_{ice})^2 + \left(-c_w \delta T_f\right)^2\end{matrix}}$$
$$= \sqrt{\begin{matrix}\left(-(0.0836)^{-2}(4186 m_h + C_d)(T_h - (0.1))(0.0836)\right)^2 + \left((0.0836)^{-1}(4186(0) - 4186(0.1))\delta m_h\right)^2 \\ + \left((0.0836)^{-1}83(0) - 83(0.1)(5)\right)^2 + (4186(1))^2 + (-4186(0.1))^2\end{matrix}}$$