A copper cylinder has a mass of 76.8 g and a specific heat of 0.092 cal/g°C. It is heated to 86.5°C and then put in 68.7 g of turpentine whose temperature is 19.5°C. The final temperature of the mixture is 31.9°C. What is the specific heat of the turpentine?

\[ Q_1 = Q_2 \quad \Rightarrow \quad Q = mC \Delta T \]

\[ m_1 = 76.8 \text{ g} \]
\[ C_1 = 0.092 \text{ cal/g°C} \]
\[ T_{i1} = 86.5°C \quad \Delta T = 54.6°C \]
\[ T_{F1} = 31.9°C \]
\[ m_2 = 68.7 \text{ g} \]
\[ C_2 = \ ? \]
\[ T_{i2} = 19.5°C \quad \Delta T = 12.4°C \]
\[ T_{F2} = 31.9°C \]

\[ m_1 C_1 \Delta T_1 = m_2 C_2 \Delta T_2 \]

\[ C_2 = \frac{m_1 C_1 \Delta T_1}{m_2 \Delta T_2} \]

\[ C_2 = \frac{(76.8 \text{ g})(0.092 \text{ cal/g°C})(54.6°C)}{(68.7 \text{ g})(12.4°C)} \]

\[ C_2 = 0.453 \text{ cal/g°C} \]