Question #84917, Chemistry / General Chemistry

Fifty grams of ice at -10°C is added to water at 0°C.How many grams of water will solidify and stick to the ice?

Solution

Assume that the system has reached thermal balance at 0°C; there is no temperature exchange with external environment, there is an excess of water and all heat produced by water freezing is consumed by ice. Then:

$Q_{melt} = Q_{fr}$

$cm_{ice} \Delta T = \lambda m_w$, where c – specific heat of ice (0.5cal/g-C°); λ – specific heat of freezing of water (80 cal/g).

$m_w = \dfrac{cm\Delta T}{\lambda} = \dfrac{0.5 \times 50 \times 10}{80}$ = **3.125 (g)**

Answer

3.125 grams of water will solidify and stick to the ice.