\[ 11.25 (T_f - 65.4) J + 418 (T_f - 20.0) J = 0 \]
\[ 11.25 T_f - 735.75 + 418 T_f - 8360 = 0 \]
\[ 429.25 T_f = 9095.75 \]
\[ T_f = 21.2^\circ C \]

6.30

We have \( g \) \( \text{NH}_4\text{NO}_3(s) \), which we can convert to mol.
So by finding the \( q \) transferred from the \( H_2O(g) \) to the \( \text{NH}_4\text{NO}_3(s) \), we can find the
heat of solution.

\[ \text{NH}_4\text{NO}_3(s) \rightarrow \text{NH}_4^+(aq) + \text{NO}_3^-(aq) \quad \Delta H_{rxn} \]

In calorimeter, \( \Delta H_{rxn} + \Delta H_{H_2O} = 0 \)

\[ \Delta H_{rxn} = -\Delta H_{H_2O} = -mC_s\Delta T \]

\[ \Delta H_{rxn} = -(75.0 \text{ g})(4.18 J/\text{g}^\circ C)(15.8 - 21.6)^\circ C = 1818.3 J \]

So heat of sol'n is
\[ \Delta H_{\text{sol'n}} \]
\[ \frac{1818.3 J}{5.63 \text{ g NH}_4\text{NO}_3(10^3 J/mole) \text{ mol NH}_4\text{NO}_3} \]

\[ = 26 \text{ kJ/mole} \]