

39. To accomplish the phase change at 78°C , $Q = L_V m = (879)(0.510) = 448.29 \text{ kJ}$ must be removed. To cool the liquid to -114°C , $Q = cm|\Delta T| = (2.43)(0.510)(192) = 237.95 \text{ kJ}$, must be removed. Finally, to accomplish the phase change at -114°C , $Q = L_F m = (109)(0.510) = 55.59 \text{ kJ}$ must be removed. The grand total of heat removed is therefore $448.29 + 237.95 + 55.59 = 742 \text{ kJ}$.