# Chemistry 236 -- Quiz 8

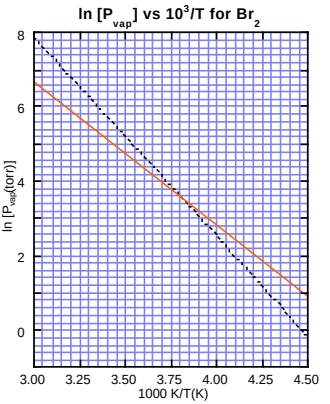
Lab Day ___

October 24 2007 — Phase Equilibria: The Triple Point

**Pledge and signature:**

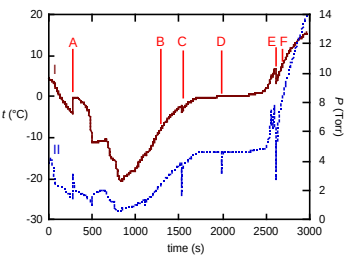
**Note:** If you want your paper returned folded (*i.e.*, score concealed), please print your name on the back.

1. (8) Consider the accompanying figure, for vapor equilibrium with both the solid and liquid phases of $Br_2$. Using this figure, determine (a) the triple point $T$ and $P$; (b) the normal boiling point $T$; and (c) $\Delta H_{m,vap}$. You should obtain $T$s within ~1%, $P$s to 5%, and $\Delta H_m$ to 2%.




2. (2) Bob and Carol record sublimation and vapor $P$ data for a substance near its triple point and obtain $\Delta H_{sub}$ = 35.1 kJ/mol and $\Delta H_{vap}$ = 29.1 kJ/mol. Ted and Alice do the same experiment on the same substance and obtain $\Delta H_{sub}$ = 31.5 kJ/mol and $\Delta H_{vap}$ = 36.2 kJ/mol. Which of these sets of results must certainly be wrong, at least in part; and how do you know this?

3. (4) The accompanying figure shows typical data for our TP experiment. Identify (a) the $t$ and $P$ curves, (b) a region where three phases are present in equilibrium, (c) a region of good sublimation vapor $P$ data, and (d) a region of good vapor/liquid data. [Give letters for (b-d).]




4. (2) On going from the Clapeyron equation, $\frac{dP}{dT} = \frac{\Delta S}{\Delta V}$, to the integrated Clausius-Clapeyron equation (which you used in 1c above), which of the following did we employ?

   a. $\Delta S = T\,\Delta H$ b. $d(1/T) = T^{-2}\,dT$ c. $\ln P^2 = -2 \ln (1/P)$ d. $\Delta H_m$ = constant
   e. $T_0$ = triple point $T$ f. none of these g. more than one of these