

1. It is found that a certain liquid boils at a temperature of 95°C at the top of a hill, whereas it boils at a temperature of 105°C at the bottom. The latent heat is 1000 cal/mole . What is the approximate height of the hill?

(Hints: neglect the molar volume of the liquid phase relative to the molar volume of the gaseous phase (i. e. $v_g - v_l \approx v_g$) and approximate the molar volume of the gas by the ideal gas equation.

Barometric formula:

$$P(h) = P_0 e^{-\frac{Mg}{RT_{\text{air}}}h}$$

M : Molar mass of air: 0.02896 kg / mole , T_{air} temperature of the air (assume the same temperature at bottom and top of the hill. Make a reasonable assumption for air temperature). h : height above the bottom of the hill, universal gas constant $R = 8.314\text{ J/(mol K)}$, g gravitational acceleration 9.81 m/s^2