

Quiz 5, 22 March 2013

Ethanol,  $\text{CH}_3\text{CH}_2\text{OH}$ , boils at  $80^\circ\text{C}$  at a pressure of 1 bar. Draw a pressure composition diagram of a mixture of water and ethanol as a function of the mole fraction of water. Do not worry about exact numbers, but instead make sure that the qualitative features of your figure, including the  $x$ - and  $y$ -axes and your judgment about ideal or nonideal behavior of this solution are clear. If you need to, specifically state the assumptions you used to draw this figure.

$$T_{\text{vap}}(\text{EtOH}) < T_{\text{vap}}(\text{H}_2\text{O}) \Rightarrow P^*(\text{EtOH}) > P^*(\text{H}_2\text{O})$$

EtOH's intermolecular interactions are vander Waals and weak H-bonding  
H<sub>2</sub>O's " " are dipole-dipole, strong H-bonding, and vdw.

This will be a non ideal solution dominated by repulsive interactions

