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**Vapour pressure and composition of liquid phase**

Suppose you have an ideal mixture of two liquids A and B. Each of A and B is making its own contribution to the overall vapor pressure of the mixture - as we've seen above. Let's focus on one of these liquids - A, for example. Suppose you double the mole fraction of A in the mixture (keeping the temperature constant). According to Raoult's Law, you will double its partial vapor pressure. If you triple the mole fraction, its partial vapor pressure will triple - and so on. In other words, the partial vapor pressure of A at a particular temperature is proportional to its mole fraction. If you plot a graph of the partial vapor pressure of A against its mole fraction, you will get a straight line.

Vapour pressure Vapour pressure

VP Of pure A

O A Mole fraction  1.0 A

Now we'll do the same thing for B - except that we will plot it on the same set of axes. The mole fraction of B falls as A increases so the line will slope down rather than up. As the mole fraction of B falls, its vapor pressure will fall at the same rate.

Vapour pressure Vapour pressure

VP of pure B

VP Of pure A

O A Mole fraction  1.0 A

1.0 B OB

Notice that the vapor pressure of pure B is higher than that of pure A. That means that molecules must break away more easily from the surface of B than of A. B is the more volatile liquid. To get the total vapor pressure of the mixture, you need to add the values for A and B together at each composition. The net effect of that is to give you a straight line as shown in the fig.

Vapour pressure Vapour pressure

VP of pure B total vapoure pressure of mixture

VP Of pure A

O A Mole fraction  1.0 A

1.0 B OB