

Azeotropes

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Abstract:

Today's article is about azeotropes.

Definition:-

By definition, mixtures of liquids which boil at constant temperature in a liquid such that the distillate has the same composition as that of liquid mixture are called constant boiling mixtures or azeotropic mixtures or simply azeotropes.

The constituent of an ideal solution or the solution which depart only slightly from ideality by Raoult's law can be separated by a technique known as fractional distillation. The process of fractional distillation find useful application in number of industrial applications such as refining of Petroleum. Fractional distillation is based on the fact that the paper obtained on boiling a binary solution contains a higher percentage of more volatile liquid. Incontinence in the paper adjust literature in more volatile component is obtained which was at a temperature different from that at

which the original solution boils. On the other hand if the deviation from Raoult's law are so large so as to produce a maxima and minima in the vapour pressure k_a then a corresponding maxima and minima appears in the boiling point curve. Such binary solutions at some definite composition distil over without any change in composition. The distillate obtained on dissolution has the same composition and the same boiling point is that of the original solution. Such solutions are referred to azeotropic mixture or constant boiling mixtures.

Azeotropic mixtures can't be completely separated into constituency by fractional distillation because such mixtures of liquid boils at constant temperature like pure liquids and the distillate has the same composition as that of liquid mixture. As already mentioned as your tubing mixtures are formed by non ideal solutions. There are three types of non ideal solutions. The number one is those which show small positive deviations. These solutions do not form as your topic mixture at any composition and distilled over with a definite change in composition therefore components of this type of non ideal solutions can be separated completely by fractional

distillation. The number 1 is those which show large positive deviation from Ideal behaviour and number 3 are those which show large negative deviation from Ideal behaviour. Solutions of the number 2 and number 3 form azeotropic mixtures.

There are two types of azeotropic mixtures:-

- **Minimum boiling point azeotropes:-** these are formed from liquid pairs which show positive deviation from Ideal behaviour. Such an azeotropes correspond to an intermediate composition of which the total vapour pressure is the highest and does boiling point is the lowest. Such azeotropes has boiling point lower than either of the pure components.
- **Maximum boiling point azeotropes:-** these are formed by liquid pairs which show negative deviation from Ideal behaviour such as corresponds to an intermediate composition for which the total vapour pressure is lowest and does boiling point is the highest. Such azeotropes

have boiling points higher than either of the pure composition.

Azeotropes are not definite compound because the composition not remain constant on changing pressure as on changing the pressure both the boiling point and the composition changes.

Reference:-

Inorganic Chemistry:- prof K.l