

CHE201 IMPORTANT SUBJECTIVE SOLVED

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Physical chemistry?

Ans:

Physical chemistry is the study of the underlying physical principles that govern the properties and behavior of chemical systems.

Define chemical system?

The system is the part of the universe being studied, while the surroundings are the rest of the universe that interacts with the system. A system and its surroundings can be small or large.

A chemical system can be studied from either a microscopic or a macroscopic viewpoint.

The microscopic viewpoint is based on the concept of molecules.

The macroscopic viewpoint studies large-scale properties of matter without explicit use of the molecule concept.

Define Gibbs free energy?

Gibbs Free Energy:

The Gibbs free energy of a system at any moment in time is defined as the enthalpy of the system minus the product of the temperature times the entropy of the system $G = H - TS$. The Gibbs free energy of the system is a state function because it is defined in terms of thermodynamic properties that are state functions.

Difference b/w open, closed and isolated system?

| | | |
|-------------|---------------|-----------------|
| Open System | Closed system | Isolated system |
|-------------|---------------|-----------------|

| | | |
|--|---|--|
| Open system is one where transfer of matter between system and surroundings can occur. | Closed system is one where no transfer of matter can occur between system and surroundings. | Isolated system is one in which system does not interact in any way with its surroundings. □ An isolated system is obviously a closed system, but not every |
| | | closed system is isolated. |
| Can exchange matter. | No exchange of matter. | No exchange of matter. |
| Can exchange heat energy. | Can exchange heat energy. | No exchange of heat. |

Applications of equilibrium constant?

Applications of Equilibrium Constants:

1. The magnitude of the equilibrium constant, K , indicates the extent to which a reaction will proceed:

If K is a large number, it means that the equilibrium concentration of the products is large. In this case, the reaction as written will proceed to the right (resulting in an increase in the concentration of products)

If K is a small number, it means that the equilibrium concentration of the reactants is large. In this case, the reaction as written will proceed to the left (resulting in an increase in the concentration of reactants).

Knowing the value of the equilibrium constant, K , will allow us to determine:

The direction a reaction will proceed to achieve equilibrium

The ratios of the concentrations of reactants and products when equilibrium is reached

2. Predicting the Direction of a Reaction

If $Q = K_c$, then the system is already at equilibrium

If $Q > K_c$, then essentially we have too much product and the reaction will proceed to the left (to reduce the concentration of product and increase the concentration of reactant)

If $Q < K_c$, then essentially we have too little product and the reaction will proceed to the right (to produce more product and decrease the concentration of reactant)

. Calculation of the Equilibrium Concentration of a Reactant or Product

Many types of equilibrium problems deal with determining how much of a product (or reactant) we will have once a reaction reaches equilibrium.

What is the reason of failure of ideal gas equation and how it can be corrected? Combining all three laws of gases,

we get the ideal gas equation: $pV = nRT$

for ideal gas it is assumed as

Ideal gas particles occupy negligible volume

Ideal gas has negligible intermolecular interactions

Ideal gas equation shows deviations from

Avogadro's Hypothesis

Boyle's Law

Charles' Law

So its called

Failures of ideal gas equation.

Vander walls equation is a solution for correction.

Describe Le Chatelier's principle with effect of change in concentration, temperature and pressure?

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