Chemistry of Applied Materials

1. The first law of thermodynamics. Internal energy. Enthalpy. Consequences of the First Law Thermodynamics.
2. Heat capacity. Expression of heat capacity in isobaric and isochoric conditions. Addiction Heat capacity from temperature.
3. Application of the first law of thermodynamics to chemical processes. Hess's Law. Calculation Thermal effects of chemical reactions based on Hess's law.
4. Dependence of the thermal effect on temperature. Kirchhoff's equation.
5. The content and formulation of the second law of thermodynamics. Reversible and irreversible Processes.
6. Entropy. Change in entropy in some processes: during phase transformations, during Heating system, in chemical reaction.
7. The combined equation of the first and second laws of thermodynamics. Characteristic Functions as criteria for the direction of processes.
8. Isochoric-isothermal potential.
9. Isobaric isothermal potential.
10. The concept of the chemical potential. The chemical potential of an individual substance in Real mixture.
11. The law of mass action. The equilibrium constant of a chemical reaction. Ways of expression. Equilibrium constant.
12. The effect of temperature on chemical equilibrium. Isobar equation and isochore chemical reaction.
13. The third law of thermodynamics. Nernst's heat theorem. Postulates of Planck.
14. Dependence of the heat of the phase transition on pressure and temperature. Clausius–Clapeyron relation.
15. Solutions. The dependence of the saturated vapor pressure of the solvent on the concentration Dilute solution.
16. Solutions. Decrease in freezing point of solutions as a function of concentration Dissolved nonvolatile substance.
17. Solutions. The dependence of the increase in the boiling point of solutions on the concentration Dissolved non-volatile substance.
18. Phase equilibria. Gibbs' Phase Rule.
19. Phase diagrams of two-component systems. Eutectic point.
20. Systems with limited mutual solubility of liquids. Alexeyev's rule.
21. The vapor equilibrium is a liquid solution in systems with unrestricted mutual solubility Liquids. Azeotropic mixtures. Konovalov's laws.
22. The concept of colloidal systems and features of the colloidal state. Classification Disperse systems by the size of dispersed particles.
23. Preparation of colloidal systems by dispersion. Dispersion methods: Mechanical, electrical, ultrasonic. Cleaning of colloidal solutions.
24. Production of colloidal systems by chemical condensation. The structure of colloidal Particles.
25. Molecular-kinetic properties of colloidal systems. Sedimentation. Sedimentation analysis.
26. Adsorption processes at the interface of phases. Physical and chemical adsorption.
27. Adsorption processes at the interface of phases. Quantitative expression of adsorption. Adsorption isotherm. The Bedeker-Freundlich equation. Henry's Law.
28. Adsorption at the solid-gas interface. Theory of monomolecular adsorption. Langmuir Adsorption Equation
29. Adsorption at the solid-gas interface. Polyany's theory of polymolecular adsorption. BET Theory.
30. Capillary condensation.