Рабочий лист № 4

Subject: **“Phase equilibria”**

Theoretical part

Vocabulary

- Найдите соответствие, запишите слова в словарную тетрадь.

boiling	сублимация	vapor	испарение
freezing	термический анализ	to reduce	переход, превращение
unfolding	кривая охлаждения	dynamic equilibrium	указывать,подчеркивать
unzipping	остановка, прекращение	condensation	фазовая диаграмма
phase transition	предсказывать	matching rates	Граница фаз
melting	тройная точка	vapor pressure	жидкий
vaporization	неизменный	sublimation	твердый
conversion	газообразный	thermal analysis	кипение
to point out	уменьшать, снижать	the cooling curve	замерзание
phase diagram	динамическое равновесие	halt	развертывание
phase boundary	конденсация	to predict	деполимеризация
liquid	сопоставимые скорости	triple point	фазовый переход
solid	давление пара	unchangeable	плавление

- Составьте 3 предложения, употребляя словарные слова.

Examples: *Many phase changes are common everyday phenomena, and their description is an important part of physical chemistry.*

The phase diagram *of a substance is a map showing the conditions of temperature and pressure at which its various phases are thermodynamically most stable.*

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Main laws, equations and definitions

- Прочитайте и запишите русские аналоги (воспользуйтесь конспектами лекций, учебником, интернетом).

A state of dynamic equilibrium is _____

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Fig. 1 The experimental variation of the vapor pressure of water with temperature (нарисуйте график p=f(T))

The Clapeyron equation:

The Clausius–Clapeyron equation:

Practical part and home work

- Прочитайте и переведите на русский язык

The use of phase diagrams in the study of proteins

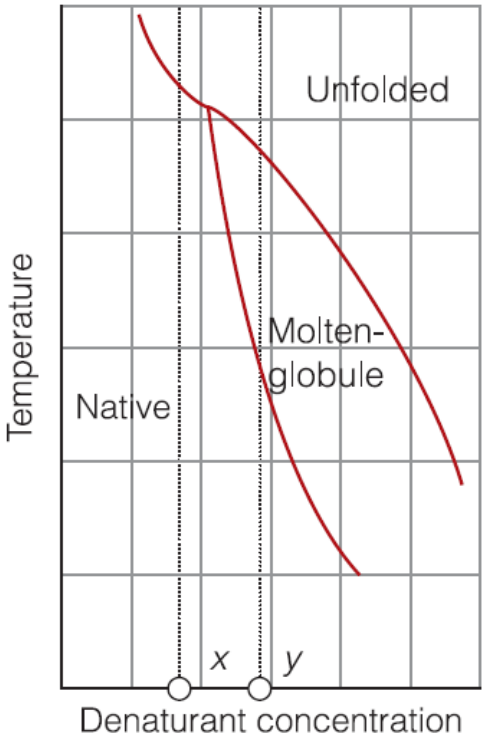

Fig. 2. An example of a temperature–composition diagram showing denaturation of a protein in a native phase into molten globule and fully unfolded phases**.**

As in the discussion of pure substances, the phase diagram of a mixture shows which phase is most stable for the given conditions. However, composition is now a variable in addition to the pressure and temperature. Phase equilibria in binary mixtures may be explored by collecting data at constant pressure and displaying the results as a temperature–composition diagram, in which one axis is the temperature and the other axis is the mole fraction or concentration.

Temperature–composition diagrams may be used to characterize intermediates in the unfolding of a protein caused by denaturation with a chemical agent. For example, urea, CO(NH2)2, competes for NH and CO groups, interferes with hydrogen bonding in a polypeptide, and disrupts the intramolecular interactions responsible for its native three-dimensional conformation. A temperature–composition diagram, such as the idealized form shown in Fig. 2, can reveal conditions under which different forms of the polypeptide can exist. The idealized diagram shows three structural regions, or phases: the native form, the unfolded form, and a ‘molten globule’ form, a partially unfolded but still compact form of the protein. As usual, two phases in equilibrium define a line in the diagram, and a point represents a unique set of conditions under which the three phases are in equilibrium.