

Chemistry1

Syllabus Number 5A103
Basic Major Subjects
Requisites 2 credit
TAKAHASHI, Senji

1. Course Description

The following subjects will be studied during the course.

- (1) Basic properties of natural substances.
- (2) Atomic structure and various chemical bonds.
- (3) Properties of gases, liquids and solids, and phase changes.

2. Course Objectives

Chemistry is one of the fundamental subjects for students who study in the Department of Biosciences. This course provides an opportunity to learn the basic properties of substances and their reactions. Fundamental knowledge of chemistry will be provided in class to help to understand the related classes in subsequent years and to learn basic knowledge required to understand life sciences.

3. Grading Policy

Reports and occasional test (20%) results are considered with final examination results (80%).

4. Textbook and Reference

Textbook

Yoshio Masuda and Kiyoshi Sawada "Rikei no tameno kisokagaku" (in Japanese)

Kagaku-Dojin INC
ISBN978-4-7598-1055-4

Reference
Yoshito Takeuchi "Dynamic wide zusetu kagaku" (in Japanese)
Tokyo Syoseki
ISBN4-487-36760-3

5. Requirements(Assignments)

(Preparation of lecture) The students are required to read the corresponding part of the text in advance, make it clear what they don't understand, and be ready to ask during the lecture (2 hr.).

(Review of lecture) The students should check any contents, which they could not understood, after the lecture (1 hr.).

6. Note

7. Schedule

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| [1] | Some chemical preliminaries (1) Classification of substances |
| [2] | Some chemical preliminaries (2) Elements / Chemical change and physical change |
| [3] | Atomic structure (1) Atoms, ions and isotope |
| [4] | Atomic structure (2) Atomic orbitals and electron configurations |
| [5] | The periodic law (1) The periodic table of elements |
| [6] | The periodic law (2) Ionization energy and electron affinity |
| [7] | Chemical bonding (1) Ionic bonds and covalent bonds |
| [8] | Chemical bonding (2) Hydrogen bonding / Electronegativity |

- [9] Concept of amount of substance (1) Atomic weight, molecular weight, formula weight
- [10] Concept of amount of substance (2) Amount of substance
- [11] Chemical equation (1) How to make a chemical and ionic equation
- [12] Chemical equation (2) The law of conservation of mass
- [13] The three states of matter and thermal motion (1) Properties of gases, liquids and solids, and phase changes
- [14] The properties of gases (1) Gas law (Boyle-Charles's law / Gas state equation)
- [15] The properties of gases (2) Dalton's law of partial pressures / Real gas and ideal gas