THE STUDY OF THE STRUCTURE OF ATOMS OF ELEMENTS OF LARGE AND SMALL PERIODS BY A MODERN METHOD

Raxmonov Sh.T., Ikhtiyarova G.A.
Tashkent State Technical University

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Abstract: *This article describes the ways of explaining the topic "Atomic structure of small and large period elements" in a new interpretation. Of course, this recommendation is important for teachers of chemistry, which describes ways of explaining the topic in a broad manner based on a new and innovative approach. Because nowadays innovations are used in every field, including education. It is important that the teacher aims to improve the quality of education by using modern pedagogical technologies and innovative methods in each subject. This guide is definitely important for chemistry teachers.*

Keywords: *chemical element, innovation, elements of a large period, elements of a small period, atomic structure.*

ИЗУЧЕНИЕ СТРОЕНИЯ АТОМОВ ЭЛЕМЕНТОВ БОЛЬШИХ И МАЛЫХ ПЕРИОДОВ СОВРЕМЕННЫМ МЕТОДОМ

Аннотация: *В данной статье описаны способы объяснения темы «Атомное строение элементов малых и больших периодов» в новой трактовке. Безусловно, эта рекомендация важна для учителей химии, в которой описываются способы объяснения темы в широком смысле на основе нового и новаторского подхода. Потому что сегодня инновации используются во всех сферах, в том числе и в образовании. Важно, чтобы учитель был нацелен на повышение качества образования за счет использования современных педагогических технологий и инновационных методов по каждому предмету. Это руководство, безусловно, важно для учителей химии.*

Ключевые слова: *химический элемент, инновация, элементы большого периода, элементы малого периода, атомная структура.*

INTRODUCTION

Today, the basis of sustainable development in any country is an innovative activity. History shows that man has travelled a complex path with his intelligence from inventing the first working tools to the discovery of algorithms and nanoparticles, the modern innovative computers, solar and other high technologies.

Teachers are always engaged in experimentation and innovation. The main theme of this activity is the idea that active learning produces the best results. Active learning is any teaching method involving students in the learning process and values their independence. Active learning often differs from traditional lecturing, where students passively receive information from the teacher [1]. Many methods of active learning have been explored, such as rotating courses, automated lessons, group learning, peer learning, inquiry learning, just-in-time learning, blended classrooms, hybrid courses or process-oriented research[2].

MATERIALS AND METHODS

Active learning includes traditional methods of organizing lessons (passive participation in lectures) and alternatives to traditional exams: they are new, such as journal reports, article analysis reports, or exams with all documents allowed. consisting of test formats. increase students' independence and activity in the educational process. As Crooks (1988) points out, classroom

assessment affects students in many ways: it guides their judgments about what is important to learn, their learning approaches, and their time (e.g., spaced practice). constructs reinforces and influences learning. develop sustainable learning strategies and skills.

New teaching approaches differ from classical methods in encouraging active learning. Despite claims that new teaching approaches increase student motivation and achievement, empirical research on these positive effects, particularly on achievement, is lacking [4].

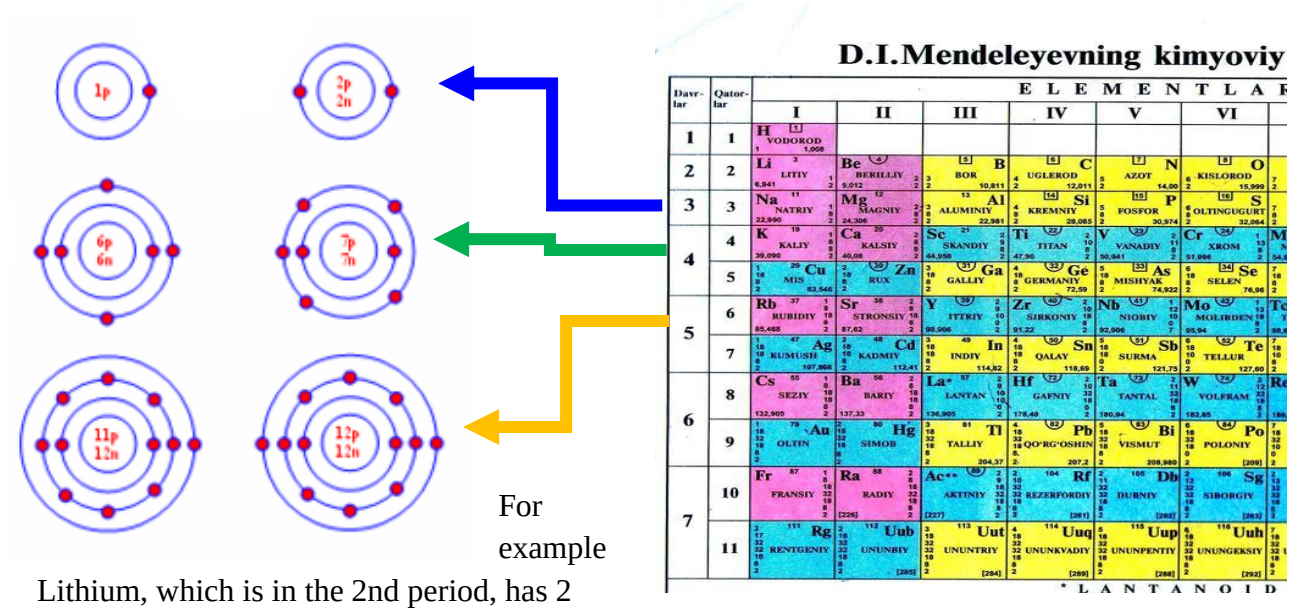
In the 8th-grade chemistry textbook, students have difficulty mastering the topics of the atomic structure of elements of a small period and the atomic structure of elements of a large period. Based on the state educational standard, in the chemistry curriculum, a total of 1 hour and 2 hours are allocated to these two topics. These topics are suitable for A2+ level. The student easily understands the element's serial number, symbol, number of protons in the nucleus, and number of electrons, but finds it difficult to make the arrangement of electrons around the atomic nucleus - electronic configuration.

RESULTS AND DISCUSSION

If the atomic structure of small and large periodic elements is explained as follows, the student will easily understand and can create an independent electronic configuration.

Step 1: Understand the layers around an atom. In which period the element is located, there will be as many electron shells around it.

Scheme 1



For example Lithium, which is in the 2nd period, has 2 electron shells around its atomic nucleus, and Sodium, which is in the 3rd period, has 3 electron shells around its atomic nucleus.

Step 2: it is necessary to explain which orbitals are located in each electronic shell. There are 4 different orbitals in an atom: s,p,d,f. The following table explains the location of orbitals in each electron shell.

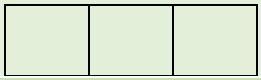
Table 1

floors	orbitals			
1st floor	1s			
2nd floor	2s	2 p		
3rd floor	3s	3 p	3d	

4th floor	4s	4p	4d	4f
5th floor	5s	5 p	5d	5 f
6th floor	6S	6p	6d	
7th floor	7s	7p		

Step 3: explain the electron capacity of each orbital. In each orbit, there are cells in which electrons are placed. Each cell contains 2 electrons.

Table 2

orbital	number of cells	electron capacitance
s		2
p		6
d		10
f		14

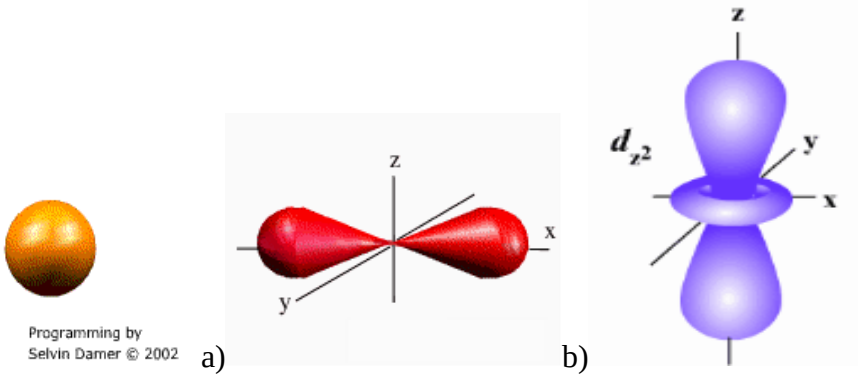


Figure 1. Orbitals and their spatial form

Step 4: Explain the shape of atomic orbitals to create understanding in students. The cells are drawn to indicate the electron capacity of the orbitals.

Electron orbitals are in the following form.

s – orbital is represented by 1 cell in the form of a sphere:

p - orbital is represented by 3 cells in the form of a

s

px	py	pm

dumbbell:

d - orbital is represented by 5 cells in the form of an addendum, and f - orbital is represented by 7 cells. The D orbit is represented in the figure above.

Step 5 - the order of placement and filling of electronic orbitals is determined by the following table.

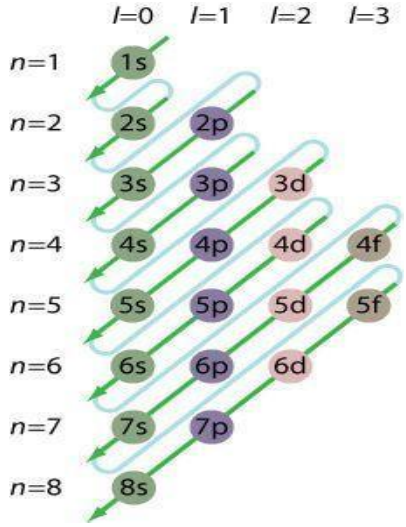


Figure 2: Scheme for drawing up the electronic configuration of elements

Although the orbitals around the atomic nucleus are located in a row, they are full

The order of departure is not sequential. To explain this pattern, attention is paid to the direction in the figure.

For example: the placement sequence

1s / 2s 2p / 3s 3p 3d /4s 4p 4d 4f / 5s 5p 5d 5f / 6s

The overflow sequence is by direction

1s 2s 2p 3s 3p 4s 3d 4p 5s 4d 5p 6s

In this case, the d orbit fills up after the s orbit that follows it. For example 3d orbital after 4s filling, 4d orbital after 5s filling.

CONCLUSIONS

In conclusion, it can be said that this recommendation is important for teachers of chemistry, which largely describes the topic based on a new, innovative approach, and easier explanations. Because nowadays innovations are used in every field, including education. The teacher must aim to improve the quality of education by using modern pedagogical technologies and innovative methods when passing each subject. This method is useful for chemistry teachers in explaining the atomic structure of small and large periodic elements using the modern method.

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