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The Application of Thinking Map Method in the Chemistry Teaching of University——Take Chemical Equilibrium as an Example

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Abstract: The application of thought map in university chemistry teaching is helpful to help students to sort out the chemical knowledge, make the complex knowledge clear and concrete, stimulate the students' enthusiasm for study and promote the students to grasp the chemical knowledge quickly. Chemical balance is an important part of Chemistry Teaching in University, and also the basis of students' learning chemistry knowledge. In the chemical balance teaching, the application of thinking map can make the knowledge systematic, organized and improve the teaching efficiency. Based on the teaching content of chemical balance, this paper analyzes the application of mind map in college chemistry.

Keywords: Mind map; College chemistry teaching; Chemical equilibrium; Application

1 The application of thinking map in the teaching of university chemistry

The middle school chemistry teaching mainly focuses on the knowledge of concept and conclusion, or the content of learning is limited to the knowledge in a certain situation, and the scope of knowledge is relatively small. The knowledge involved in university chemistry is complex, which is a huge knowledge system connected by many knowledge points. Therefore, university chemistry learning is not only the extension and deepening of senior high school chemistry, but also forms multiple knowledge points. It is necessary to sort out and integrate these knowledge points to form a knowledge system, forming different knowledge nodes and frameworks. To promote students' understanding and extension of knowledge concept, and master the corresponding teaching theory, and improve students' ability to find and solve problems. Thinking map is a kind of graph form thinking tool which can express the human thought process, and it is a revolutionary and innovative thinking tool mode. It can clearly show the relationship between different themes through thinking map, and improve the efficiency of mathematical knowledge arrangement and learning [1]. Although the current thinking map has been gradually applied in the teaching field, it is mainly used in primary and secondary schools, and the application of thinking map in university education is relatively small. The main function of thinking map is to form different themes by scattered knowledge points and nodes, and the themes are integrated and cross, forming a thinking diagram with each node showing the emission stereoscopic structure with the theme as the core. Therefore, the application of mind map in university chemistry is feasible, which is conducive to the effective connection of each node in chemistry and the improvement of students' learning efficiency.

2 Analysis of the teaching theme of chemistry balance in university

The main object of chemical equilibrium research is reversible chemical reaction. It can be expressed as a + BB. CC + DD. by this formula, the equilibrium constant can be deduced as. Through the derivation of constant, the factors affecting the constants can be analyzed, including the constant only related to temperature, and the equilibrium of chemical reaction can be judged under certain conditions, The direction of chemical reaction can be determined. At the same time, the knowledge also includes reversible chemical reaction, the characteristics of reversible chemical reaction include reverse reaction, quantitative reaction, equivalent reaction and dynamic change. In reversible chemical reaction, no matter it is positive or reverse reaction, the reaction can not be completed completely. In addition, this part also introduces the conversion rate of reaction equilibrium. The conversion rate of positive reaction is equal to that of reverse reaction, which is equal to the ratio of reactant quantity and total reactant quantity × 100%[2]. Finally, the external conditions of chemical equilibrium movement are introduced, and it is called the leshterian principle. The equilibrium movement is mainly affected by temperature, pressure and concentration. The change of temperature is that with the increase of reaction system temperature, the direction of equilibrium movement is the direction of heat absorption reaction; The reaction in pressure is that with the increase of pressure in the reaction system, the equilibrium reaction will move to the small side; From the concentration perspective, if the concentration of reactant is added to the reaction system, the reaction will move to the side not added. These knowledge contents are the core contents of chemistry balance teaching, and they have many knowledge points and are scattered.

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3 The related knowledge points and the extension of knowledge points of chemical equilibrium

Chemical equilibrium is a kind of relationship between reactants and products on the surface. In the research of change quantity, we can start from thermodynamics to extend the teaching knowledge points. The movement of chemical equilibrium and conversion rate are analyzed by thermodynamics. The mode of thinking map is formed by the generalization of limit node. The specific mode of thinking map is as follows:

In this part of knowledge, the limit and direction of chemical reaction can be judged by thermodynamic data, and the balance of yield and movement of chemical reaction can also be analyzed by actual measurement value.

Analysis of knowledge nodes of chemical equilibrium constant. Chemical equilibrium constant is divided into many small nodes, including empirical equilibrium constant, standard state, standard equilibrium constant, etc. at the same time, each small node is divided into different knowledge points. The equilibrium constant includes pressure empirical equilibrium constant and concentration empirical equilibrium constant. The standard state can be expressed as p Θ= 105Pa·c Θ= The standard equilibrium constant can be divided into two types: standard pressure equilibrium constant and standard concentration equilibrium constant. These knowledge points have their own characteristics. For example, there are essential differences between pressure empirical equilibrium constant and concentration empirical equilibrium constant. There is no unit between standard pressure equilibrium constant and standard concentration equilibrium constant, and the dimension is 1. the value of concentration empirical equilibrium constant and standard concentration equilibrium constant is equal, The values between the empirical equilibrium constant and the standard concentration equilibrium constant need to be equal under certain conditions. The corresponding values can be obtained by thermodynamics for both the standard pressure equilibrium constant and the standard concentration equilibrium constant. The application of equilibrium constant is helpful to the judgment of chemical reaction direction and conversion rate. These knowledge contents can be sorted out by thinking map, which can form a clear framework for students to master knowledge.

4 The cohesion strategy of university chemistry balance

Chemical balance is the content that starts from the high school stage, but the content of chemical balance in high school is relatively simple and has a small scope, most of which have set certain restrictions. Through the comparison, analysis and understanding of the similarities and differences between the chemical balance in senior high school and the university chemistry balance, it is helpful to promote the students' understanding of the chemical knowledge. The application of thought map is helpful to help teachers and students distinguish high school chemistry from university chemistry, including the differences in content, connotation and application.

The relationship between chemistry in senior high school and chemistry balance knowledge in University. From the analysis of the reaction situation between high school chemistry and university chemistry balance, the two are identical in the direction of reaction. The difference is reflected in the introduction of thermodynamics. The introduction of university chemical thermodynamics is based on the concept of potential function. By comparing the normal number of standard pressure balance with chemical reaction, the reaction quotient is compared and analyzed. The main contents of the comparison of temperature applied in chemical balance in high school are empirical equilibrium constant and concentration quotient in the reaction, which are essentially different. At the same time, there are some differences between the chemical balance in high school and university chemistry in terms of reaction range, method and condition. The chemical balance of university includes empirical equilibrium constant, standard equilibrium constant and mole fraction equilibrium constant. But the high school did not fully involve these contents in the explanation of chemical balance, only for the empirical equilibrium constant to learn, and the concentration balance constant as the main content of the explanation, involving a narrow range, depth is insufficient.

Conclusion:

In conclusion, the application of thought map in university chemistry teaching is conducive to the systematization and centralization of complex and scattered knowledge. Students can sort out knowledge through the drawing of thinking map, and the completed thinking map can be used as an important guide for students to study and review, so that students can find their own weaknesses at a glance, And combined with the weak points to strengthen the targeted, improve students' chemical learning ability. Especially in the aspect of chemical balance, students have a certain learning foundation, which will be difficult in the connection between high school and university teaching. The application of thinking map can promote the rapid connection and transformation of students' thinking and improve the efficiency of chemical balance learning.

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