

CHAPTER I

INTRODUCTION

1.1 Background :

Chemistry, is subject about atom, particles, molecule, and the reaction in the universe. Chemistry are abstract concept difficult to explain chemical phenomena by using these concepts, students cannot see directly the concept (Nahum, Hofstein, 2004) Chemistry is a subject that is learn about matter , based on abstract concepts and therefore difficult to understand and learn, and its difficult to make student understand something that cant register by senses (Milenkovic, Hrin, Segedinac, Horvats, 2016). Chemistry is the science concept of matter and its changes. To explain chemical phenomena that happen of everyday life in around of us. The objectives of chemistry education student can understand fundamental concepts of chemistry that students can relate chemistry concept and the chemical processes behind everyday phenomena. Over the last years, there have been studies and research focusing on the difficulties of student to learning and understanding concepts of chemistry. The research find there have misconception of student in learning chemistry (Kolomuc, Tekin,2011).

Misconception is students knowledge and believes its does not match with scientifically correct. Often, students come to class with already prior knowledge about scientific phenomena and its not accurate (Turkmen, Usta, 2007). In other side, language, prior knowledge, and cognitive development can be the cause of misconceptions related to instructional process of learning process .(Bilgin, Uzuntryaki, Geban, 2003). Misconceptions may be categorized such as Present ideas of chemical knowledge is inadequate to chemistry concepts, Over-simplifications of concepts to facilitate understanding, Bad chemistry, Vernacular misinterpretations of concepts,. Students who enter the classroom with inappropriate pre-existing ideas about the concept , which are not accurate to scientific view (Kay, Yin, 2010).

Some studies have found that many student misconceptions caused by the wrong textbook and the lack of teacher's explanations. Only use a textbook to be the cause of misconceptions because if the existing knowledge of students is not relate with existing knowledge in textbook will make it increasingly large misconception. The book is the source of the content and curriculum and books become a source of lessons in class (Sanger, 1996) . Book is the core of learning process. if the book that used only describe the topic in general/not detailed or wrong in explain some subtopic, students who read only accept what they get from the book that make more misconceptions that occurs. Misconceptions in chemistry that many occurs such as the concept of the mole, the acid and bases, chemical equilibrium, electrochemistry, atomic structure and chemical changes.

Electrochemistry and redox reaction concepts have been as one of the most difficult concept for high school student. There are some misconceptions happen on this concept. Common assessment applied on this concept can not explore them because students had never been assessed on their concept and scientific process understanding. In the higher education, the concept of redox and titration are studied in the course of Basic Chemistry Electrochemistry is the basic science of chemistry which explains how electrical energy can be chemical energy and chemical energy can produce electricity (Widarti, Permanasari, Mulyani, 2016). Electrochemistry is the branch of chemistry that deals with the inter conversion of electrical energy and chemical energy. Electrochemical processes are redox (oxidation reduction) reactions in which the energy released by a spontaneous reaction is converted to electricity or in which electrical energy is used to cause a non spontaneous reaction to occur. topic in this chapter is galvanic cells, standard reduction potential, thermodynamic redox reactions, the effect of ion concentration ion cells, batteries, corrosion and electrolysis (Chang, 2011).

The application and reaction cannot we can see directly. So students just learning but not know how to apply them in their daily lives. They just learning through the book without understand of the electrochemistry. Therefore, that make topic electrochemical misconceptions. Student just learn without knowing

or understanding how this chemical phenomena can occur. On the topic electrochemical, misconceptions prevalent in topic galvanic cell, electrolysis cells, cell concentration, the salt bridge and the electrolyte solution.

Prevent of misconceptions can be identify by asking some question designed to tested concept has been studied (Adaminata, Marsih, 2011). An alternative way for identifying misconceptions, that can use in the classroom teaching, is to use items based on a multiple choice question format. Usually multiple choice tests only have tested content, but its recommended will use of second tier as student reasoning including known misconceptions to formulate relate test items (Peterson, Treagust,1989). Multiple choice two-tier tests became instrument to identifying misconceptions in students. Two-tier tasks consist of two parts test. The first tier contains the content problem, multiple choice as usually while the second part contains a reasonable explanation of the problem presented in the first tier of the task. There introducing and considering the third tier in tasks provides valuable information about students' self-confidence. Third tier is to affirmation answer of problem presented Namely, only those students who provide the correct answers in both tiers, and three tier indicate that they are sure of their answers, students understand the content of the chemistry concept (Milenkovic et all, 2016) And can be improved by adding other media such as worksheets.

Worksheets is the fundamental tools for learning media, containing required process steps of learning process and helping students to configure the knowledge and at the same time provide a full participation of activity the entire class. It has been also stated that worksheets provide guidance and offer solutions to problems of chemical concepts (Celikler, 2010). Student' worksheet is teaching materials packed in such a way that the students can learn the material on their own. Worksheet contains information and order / instruction from teachers to students to work on learning activities in the form of work, practice, or in the form of learning outcomes to achieve a goal (Ozmen and Yildirim, 2005). Worksheets

are one of the teaching methods which can be done individually or in group work and enable conceptual development

On the worksheet that contains a complete theory developed in more detail topic of electrochemistry to improve student misconceptions. To designed worksheet based on Appendix 1 contain sillaby of general chemistry II. Reox and electrochemistry was 8 sub concept, from that sub concept developed to innovative students worksheet. then instrument (three-tier) question in appendix 2 to analyze their electrochemistry topic misconceptions and used a three-tier test of knowledge as an instrument for their identification of misconceptions were carried out on the contents. Using of a three-level test (two-tier) not only aware of the misconceptions in students but also know why students choose the answer. after answer it, test it easier to evaluate misconceptions on the electrochemistry topic is efficient and simple. Can find what level of misconceptions in students knowledge in electrochemistry topic (Milenkovic et all, 2016).

Based on The Above problem, writer will do research with title :

Development of Innovative Student's Worksheet In Learning Redox and Electrochemistry Topic to Avoid Student's Misconceptions.

1.2 Problem Identification :

Based on the background, The problem identification are as follows:

1. Is Students difficult to explain chemistry concept to the daily life ?
2. Do Students have a lot of misconceptions in chemistry subject ?
3. Can Redox and Electrochemistry reaction and application cannot be seen directly makes a lot makes conception?
4. Is there student's misconception on Redox and Electrochemistry?
5. What are the factors causing of misconceptions on Redox and Electrochemistry?
6. Can Misconception be identified by three-tier diagnostic tests?
7. Can Misconception eliminated by develop effective strategy?

8. Does Worksheet stated provide guidance and offer solutions to problems of learning?
9. Can worksheet Avoid misconception on redox and electrochemistry topic?
10. How is the effect of worksheet to avoid student's misconception on redox and electrochemistry topic?

1.3 Scope of Research

1. Is Students difficult to explain chemistry concept to the daily life ?
2. Do Students have a lot of misconceptions in chemistry subject ?
3. Can Redox and Electrochemistry reaction and application cannot be seen directly makes a lot makes conception?
4. Can Misconceptions eliminated by develop effective strategy?
5. Can Misconception identified by three-tier question diagnostic tests?
6. Does Worksheet stated provide guidance and offer solutions to problems of learning.?
7. How is the effect of students worksheet to avoid student's misconception on redox and electrochemistry topic?

1.4 Problem Statement

1. Is there student's misconception on Redox and Electrochemistry?
2. What are the sources of student's misconceptions on redox and electrochemistry?
3. Can worksheet avoid misconceptions of students on redox and electrochemistry topic?

1.5 Objective :

1. To know student's misconception on redox and electrochemistry topic.
2. To know the sources of students misconceptions on redox and electrochemistry.
3. To avoid misconception of students on redox and electrochemistry topic by students worksheet

1.6 Benefit of Research

The benefit of this research :

1. Give information about the effect of students worksheet to overcome misconception on electrochemistry topic.
2. Can using as reference for another research with related title.



THE
Character Building
UNIVERSITY