

Teaching Undergraduate Students through Connectivity: Part 2

Shazia Summer^{1*} and Iftikhar Imam Naqvi¹

¹Department of Chemistry, Jinnah University for Women, Karachi, Pakistan

ABSTRACT

Physical Chemistry is one of the branches of Chemistry. Its quality teaching at undergraduate level is an issue of prime concern. Due to key involvement of mathematics and lack of extensive familiarity with it, students often consider Physical Chemistry the most difficult one. It is now the great responsibility of teachers to avoid the old practices of delivering isolated physical chemistry lectures that do not provide the complete picture of any phenomenon that is discussed in the class room. The possible connections of specified topic with other parameters are essential for a deep learning exercise. Therefore students cannot have a limited approach towards the topic. In this context teachers need to prepare and deliver their lectures in a systemic way with the involvement of students in the topic and also with the help of connectivity diagrams, so that students can enhance their skills towards determining the connections of their own between different phenomena.

Keywords: Physical, Students, Chemistry, Connectivity Diagrams.

INTRODUCTION

Chemical kinetics is an important discipline of physical chemistry which deals with the rates of chemical reactions and the factors that affect these. Such investigations are important to capture deep insight into the reaction mechanism. Its teaching requires the systemic development of concepts regarding rate and the factors affecting it. Use of connectivity diagrams can be a helpful tool to improve and augment the perceptiveness of students towards physical chemistry so that they can understand the connections between different parameters. In the previous paper (Navi and Naqvi, 2011) we presented our efforts to highlight the fundamental and derived concepts in physical chemistry and the rate of reaction was one of such issues. This presentation is continuation of our attempts to understand physical chemistry through connectivity diagrams. This paper is specifically related to the salient issues to be undertaken in understanding the rate of reaction.

Temperature and Rate of Reaction:

Rate of reaction is defined as, the change in

concentration of reactant or product with time. There are a number of factors that control the reaction rate in variety of ways. These factors include: Nature of reactant, concentration, pressure, temperature, catalyst etc.

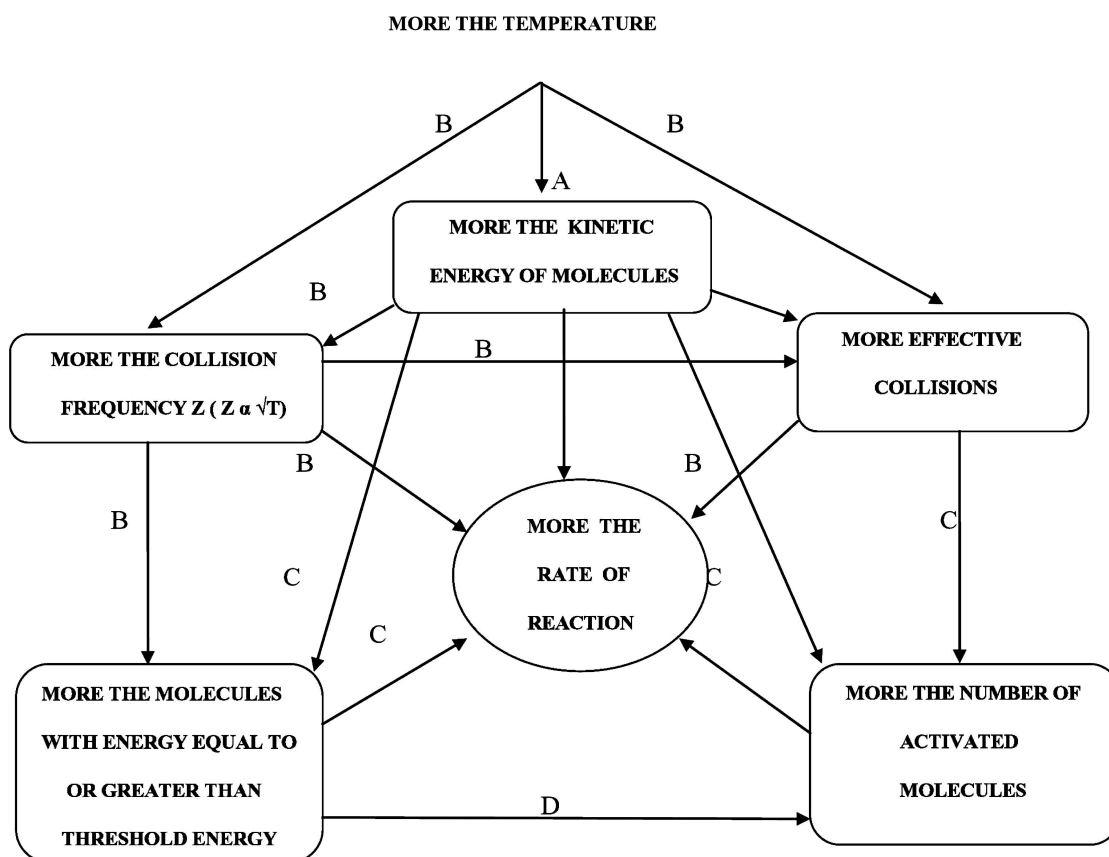
Whenever reaction kinetics is investigated, it is always incomplete without the findings of the thermodynamic parameters, and for their fixation temperature has always been a tool.

Below we illustrate a connectivity diagram or concept map that highlights salient issues related to the effect of temperature on the reaction rate.

The connectivity diagram has thus been developed by considering the following basic theories, which help to understand the connection of rate with temperature:

- A. Kinetic and molecular Theory of matter
- B. Collision theory of reaction rate
- C. Arrhenius theory
- D. Boltzmann law of distribution of energy

*Corresponding author: shaziasamar@hotmail.com



CONCLUSION

This presentation is an effort towards developing new method of teaching that is based upon developing concept maps. An example from Chemistry has been discussed but the method can be used with any discipline from natural sciences to social sciences.

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