

TEACHING ORGANIC REDOX REACTIONS

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Organic redox reactions are one of the most difficult topics to teach and learn. Various difficulties of the 'redox reactions' topic presented in literature [1]. In main part of them authors showed difficulties related to teaching and learning redox reactions. Main difficulties are due to predicting the products of redox reaction, understanding the meaning and assigning of oxidation numbers, identifying reactants as oxidizing or reducing agents, identifying the numbers of gained or lost electrons in a redox reaction; understanding stoichiometry in the electron transfer process, balancing a redox reaction, understanding the mutual dependence of oxidation and reduction reactions etc. All these difficulties fully organized in learning organic redox reactions. In addition of shown above, determination of oxidation state of each carbon atom before and after redox, correct compilation of reaction balance are specified obstructions of topic.

As known, teacher-centered learning is characterized by the teacher's explanations of content and limited interactions among classmates [2]. But investigative approach is learner-centered and does not restrict involving students physically, socially, cognitively besides allows teacher to increase the science motivation of learners.

Two groups of 15 years old pupils participated in presented study. Each group consisted of 20 learners, with almost equal opportunities to science education. One group (control) were taught redox by teacher-centered algorithmic method, using just direct instructions of teacher. Other group (experimental) members were taught by investigation method, using decolorization of aqueous solution of potassium permanganate by alkenes. Learners of experimental group had the opportunity to observe oxidation, carry out experiments by themselves, mark results of investigation, analyze and discuss with classmates what they saw at lesson.

Evaluation of learning results of the study carried out by using control quiz, containing «closed»- and «opened»-type questions about determination redox reactions, identification of oxidizing or reducing agent, number of gained or lost electrons, with requirement to arrange coefficients in reactions of oxidation various alkenes. Motivational aspect evaluated by using interview.

The results of the study showed that learning objectives achieved more fully when use investigation in comparison with algorithm by the reason of passive role of pupils in the classroom interaction, and only feedback to teachers' questions.

In addition, in those children who were taught using the research method, the increasing of science motivation was observed. We plan to carry out study devoted to comparison the algorithmic teacher-centered approach and investigative learner-centered approach in teaching inorganic redox reactions.

1. Luciane F. Goes, Keysy S. C. Nogueira, Carmen Fernande, Limitations of teaching and learning redox: a systematic review, Problems of education in the 21st century, Vol. 78, No. 5, 2020, 698, <https://doi.org/10.33225/pec/20.78.698>

2. Jean Claude Nzeyimana, Kizito Ndiokubwayo, Teachers' role and learners' responsibility in teaching and learning science and elementary technology in Rwanda, African Journal of Educational Studies in Mathematics and sciences, 2019, v.5, №2, <https://doi.org/10.4314/ajesms.v15i2.1>