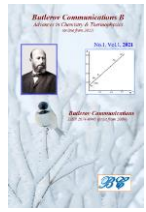
BUTLEROV HERITAGE

Butlerov Communications B
Advances in Chemistry & Thermophysics
ISSN 2074-0948 (print)

2021. Vol.1, No.1, Id.11.
Journal Homepage: https://b-journal.butlerov.com/



Thematic section: Theoretical Research.
Subsection: Physical Organic Chemistry.

Full Paper

The Reference Object Identifier – ROI-jbc-B/21-1-1-11
The Digital Object Identifier – DOI: 10.37952/ROI-jbc-B/21-1-1-11
Received 25 March 2021; Accepted 28 March 2021

Theoretical prerequisites for obtaining carbon allotropic structures using alternating magnetic fields

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Keywords: monomer, alternating magnetic field, spin, singlet-triplet transition, carbon.

Abstract

Carbon-based allotropic modifications are widely used in science and industry. Currently, a large number of methods are used to obtain allotropic modifications of carbon. Their disadvantages are the impossibility of studying the mechanism of step-by-step formation of carbon polymers from monomers and the impracticability of accuracy in calculating the final results when using electric arc processes in production, which significantly complicates the implementation of the process of "growing" pure carbon allotropic structures with specified physical and chemical properties. In this connection, the paper considers the problem of studying the mechanisms of formation of carbon polymers from monomers. For the decomposition of a hydrocarbon molecule by an alternating magnetic field into pure hydrogen and carbon, a monomolecular hydrocarbon liquid of any basic type consisting of atoms of only two chemical elements is considered. This decomposition is possible due to spin magnetic effects, since in liquids the joint lifetime of pairs of reacting particles is comparable to the time of spin evolution, and magnetic forces affect the magnetic moments and spins of radicals for a comparably long time. Spin effects resulting from singlet-triplet transitions of paired electrons of interacting atoms in the structure of a molecule that change the state of chemical interaction of atoms are described. Based on the theoretical conclusions presented, a method for obtaining carbon monomers from hydrocarbon liquids by magnetically induced spin conversion is proposed. The results obtained in this work will allow us to obtain structures with different physical and chemical properties for studying the mechanism of formation and production of carbon polymers – allotropic modifications of carbon.

For citation: Dmitry P. Shatalov, Pyotr P. Purygin, Vladimir A. Glushchenkov, Dmitry S. Sineglazov. Theoretical prerequisites for obtaining carbon allotropic structures using alternating magnetic fields. *Butlerov Communications B.* **2021**. Vol.1. No.1. Id.11. DOI: 10.37952/ROI-jbc-B/21-1-1-11

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