

OPINION

Prof. Dr. Rositca Dimitrova Nikolova,

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member of the scientific jury in the competition

for the academic position of **ASSOCIATE PROFESSOR**, announced by Institute of Organic Chemistry with centre of Phytochemistry, BAS in SG no. 91 /02.11.2021

regarding the submitted documents of Assistant Professor Dr. Atanas Atanasov Kurutos

The only candidate who submitted documents and has been admitted to participate in the competition is Assistant Professor Dr. Atanas Atanasov Kurutos, who has a permanent employment contract in the Laboratory of Organic Synthesis and Stereochemistry of the Institute of Organic Chemistry with a Center for Phytochemistry, BAS.

Atanas Kurutos graduated with a bachelor's degree in 2010 from Kingston University - London, UK and a master's degree from the Faculty of Chemistry at Sofia University in 2013 in the Master's program Modern Methods for Synthesis and Analysis of Organic Compounds. From 2014 to 2016 he was a full-time doctoral student in the Department of Pharmaceutical and Applied Organic Chemistry at the Faculty of Chemistry and Pharmacy, Sofia University “St. Kliment Ohridski ”. His dissertation won the First Prize for 2016 of the Union of Scientists in Bulgaria, as well as the Eureka Prize for 2016.

In the period 2012-2013 Atanas Kurutos worked as a chemist in the Laboratory of Organic Synthesis and Stereochemistry of the Institute of Organic Chemistry with a Center for Phytochemistry, BAS. In 2016, after a competition, he was appointed as an assistant, and in 2018 as a chief assistant in the same laboratory.

Dr. Kurutos had short-term specializations as a researcher at the Ruđer Bošković Institute, Zagreb, Croatia (2015) and as a post-doctoral student at the University of Friborg - Friborg, Switzerland (2017), Roskilde University, Roskilde, Denmark (2018) and University of Copenhagen, Copenhagen, Denmark. From October 2018 to September 2020 he was at the JSPS post-doctoral fellowship at Keio University, Tokyo, Japan.

Dr. Kurutos is the winner of the Academician Ivan Yuhnovski Award for 2020.

Dr. Atanas Kurutos presented all required documents in electronic media, which are in accordance with LDACRB, its regulations, the Regulations on the terms and conditions for acquiring SD and borrowing AP in the Bulgarian Academy of Sciences for professional field "Chemical Sciences ", related to the procedure for holding the academic position“ Associate Professor ”.

I. General characteristics of the received materials and admissibility

The presented documentation has been prepared according to all requirements and recommendations, but with certain discrepancies and omissions. Attached are:

- **According to indicator A1.** 50 points

Candidate Atanas Kurutos defended his dissertation on "Synthesis of cyanine dyes and study of photophysical properties of some of them" in 2016 under the guidance of Prof. Todor Deligeorgiev.

- **According to indicator C4.** 100 points

The presented four scientific publications on the topic of the competition, published in specialized international journals, referenced in SCOPUS and ISI Web of Science, have an impact factor from Q1 as well. According to this indicator, the candidate meets the minimum requirements of 100 points.

- **According to indicator D7.** 277 points

The candidate Ch. Assistant Professor Dr. Atanas Kurutos has co-authored 16 scientific publications, 13 of which are with impact factor and are referenced in Scopus and ISI Web of Science - 7 of Q1 (44%), 3 of Q2 (19%) and 1 from Q4 (6%), two chapters from a book / collective monograph (12%) and 3 in journals without JCR or SJR (19%). Nine of the presented publications have an IF > 3, and the total IF of the publications is 40,459. In 4 of the publications Dr. Kurutos is the first author, and in other 4 the corresponding author.

According to this indicator, the candidate exceeds the minimum requirements of 200 points.

The results of the research were presented at 35 national and international forums, such as 18 poster presentations and 13 oral presentations, 2 of which were invited.

- **According to indicator E7.** 100 points

Until the submission of the documents, 87 citations were noticed in the Web of Science (69 citations registered in Scopus). The minimum requirements for this indicator are 50 points, the candidate has submitted 50 citations for the competition, which exceeds the requirements twice.

- **According to indicator G**

Until the submission of the documents, according to the international databases - Web of Science h-index 9 and Scopus, h-index 5, the candidate meets the minimum requirements for the position of Associate Professor.

Dr. Kurutos is actively involved in project activities. Participations in 5 research projects with NSF are presented, being a leader in 2 of them, as well as participations in 3 national programs funded by the Ministry of Education and Science and others.

- **Habilitation paper in the volume of 13 pages;**

The habilitation paper on "Synthesis and study of photophysical properties of mono- and polycationic biosensors" examines and emphasizes the personal contributions of the candidate in the synthesis and photophysical research of fluorescent mono- and polymethine, styrene and azobrils, used as biosensors. Guidelines for the future development of the researched topics are also noted.

- **Teaching activity**

As a doctoral student at the Faculty of Chemistry and Pharmacy, M.Sc. Atanas Kurutos has conducted exercises for undergraduate students.

The analysis of the submitted documents shows that Dr. Kurutos not only fulfills, but also exceeds the minimum requirements of the competition in some of the indicators.

II. Evaluation of scientific results

The presented scientific communications of the candidate are in the scientific field the competition was announced in. The research of Assistant Professor Dr. Atanas Kurutos are in the field of synthesis and photophysical research of organic compounds and are mainly related to:

- Synthesis of cyanine dyes and complexes in the free state and in the presence of biomolecules and study of the possibilities for their application as fluorescent markers.

A series of lipophilic monomethian cyanide dyes containing a large number of quaternary ammonium groups have been synthesized in order to improve their affinity for polynucleotides. The localization of the dyes was studied with the help of kofocal microscopy and their absorption was confirmed.

An effective synthetic approach has been developed for the preparation of their chlorine-containing derivatives as analogues of the commercial product fluoroforthiazolorange and it has been found that the newly obtained dyes have five times higher photostability and about one hundred times lower cytotoxicity.

Amino acid conjugates with monomethicyanine dyes were obtained and their interactions with polynucleotides were studied using various spectroscopic methods.

Possibilities for application of some of the dyes as RNA-selective dyes and as fluorogenic substances for visual differentiation of living / apoptotic cells and cell cycle analysis have also been studied.

Some of the synthesized monocyanine dyes have also been studied as corrosion inhibitors.

- Synthesis of new monocationic trimethyancin dyes

Their spectral characteristics in the presence of unfibrillated and fibrillar insulin have been studied and found to form aggregates. The relationship between the photophysical properties and the structure of the dye has been studied.

As a result of research, a mechanism has been proposed by which cyanines can inhibit the formation of insulin amyloid, which in turn prevents the occurrence of pathological processes.

- Synthesis of a series of symmetric heptamethincyanine dyes containing monosubstituted piperazine.

The piperazine moiety is used as a receptor for hydroxonium ions in pH-sensitive sensors. Spectrometric studies in organic solvents and aqueous buffer solutions were performed to determine the effect of the substituent on the nitrogen atom in the piperazine cycle. Results have been confirmed with the help of computational methods and allow for the design of dye molecules with specific pKa values.

- Arylhydrazone molecular switches associated with intramolecular hydrogen bonding have been synthesized and spectrally characterized

The spectral characteristics of the substances were studied in various organic solvents.

The presented scientific publications are related to solving important problems for science and practice; and the resulting new functionalized compounds with potential use as biologically active substances. A wide range of synthetic, spectral and spectrophotometric methods were used in the research. The topic is relevant and significant.

III. Conclusion

The presented documents show that Assistant Professor Dr. Atanas Atanasov Kurutos is a specialist with a clear profile in the field of synthesis of fluorescent dyes and meets the requirements meets the requirements of the Law on Occupying the Academic Position of Associate Professor of Organic Chemistry, and has met the additional recommended criteria of the Institute of Organic Chemistry with Center for Phytochemistry, BAS.

Based on the attached documents, I propose to the esteemed Scientific Jury and the Scientific Council of the Institute of Organic Chemistry with a Center for Phytochemistry, BAS to award the scientific title "Associate Professor" to Assistant Professor Dr. Atanas Atanasov Kurutos in the professional field 4.2. Chemical sciences, scientific specialty Organic chemistry.

Sofia, 07.03.2022

Signature: