

## EVALUATION REPORT

**from** Plamen Angelov Angelov, PhD – associate professor at the Paisii Hilendarski Univerisy of Plovdiv, member of the scientific jury appointed with administrative act РД-09-95/14.07.2022

**regarding** the materials submitted in application for the position of “Associate professor” at the Institute of Organic Chemistry with Centre of Phytochemistry, Bulgarian Academy of Sciences (IOCCP-BAS) in the field of higher education “Natural Sciences, Mathematics and Informatics”, professional classification 4.2. “Chemical Sciences”, scientific specialty “Organic Chemistry”, for the needs of Laboratory “Bulgarian NMR Centre”, announced in the Bulgarian State Official Journal № 37 from 17th of May, 2022.

### 1. General presentation of the submitted materials

The only candidate in this open competition procedure is Dr. **Yavor Nikolaev Mitrev**, chief assistant professor at IOCCP-BAS, laboratory of NMR spectroscopy. The documents submitted by the candidate are in complete compliance with the Law for the Development of the Academic Staff in the Republic of Bulgaria and the internal administrative rules of IOCCP-BAS. The document set includes:

1. CV of the candidate.
2. Declaration of fulfilment of the IOCCP-BAS criteria for the position of “associate professor”
3. Diploma for the scientific and educational degree “doctor” (PhD).
4. Extended resume of the candidate’s doctoral thesis.

5. Extended habilitation report, describing the scientific contributions of the candidate (in Bulgarian and English)
6. List of scientific publications with copies of the published articles.
7. List of citations.
8. List of conference participations.
9. Information for research projects with participation of the candidate.

Yavor Mitrev has submitted 16 scientific publications for participation in this open competition. The total number of articles authored or co-authored by the candidate until now is 24. All papers of concern to the competition procedure have been published in well recognized international journals - 11 papers in Q1 journals, 2 in Q2 journals, 1 in a Q3 journal, and 2 in Q4 journals. The total number of citations noticed until now is 135, and 97 of these citations are counted towards the criteria of the current procedure. The h-index of Yavor Mitrev according to Scopus is 6.

The candidate has presented at 14 (mostly international) scientific conferences in Bulgaria and abroad.

The number of scientific projects with participation of the candidate is 9, and in one of these project Yavor Mitrev is the principal investigator.

## **2. Assessment of the Research Activities and Scientific Contributions**

The candidate has carried out most of his research at the NMR laboratory of IOCCP-BAS, he has also carried out postdoctoral research at the Geneva University, Switzerland, under the supervision of Dr. Damien Jeannerat. The scientific contributions from the research published by Yavor Mitrev fall within three main areas:

- *Applied and methodological NMR investigations*

One of the projects in this area deals with discrimination of hexabromocyclododecane (HBCD) from other brominated flame retardants in polystyrene foam by nuclear magnetic resonance. The candidate has contributed towards the development of quick NMR method for discrimination of HBCD from other brominated polymeric flame retardants. An advantage of this novel method is its compatibility with low-frequency NMR spectrometers.

Another contribution in this area is an NMR analysis of weak molecular interactions using slice-selective experiments via study of concentration gradients in agar gels. Here the candidate has taken active part in the development of an analytical technique, alternative to the conventional NMR titration in water, with the possibility of parallel analysis of a large number of samples in fully automated mode.

In another methodological investigation Yavor Mitrev has successfully used spatially selective NMR spectroscopy to study distribution phenomena in two-phase systems.

- *Application of solid-state NMR spectroscopy for structural investigations of new mesoporous materials*

Modified MCM-48 and SBA-15 silicas have been investigated by solid state NMR in a project aimed at the structural characterization of these new materials and comparative study of their CO<sub>2</sub> adsorption. Four new materials of this type have been studied with the help of solid state NMR, with focus on their CO<sub>2</sub> absorbing capacity and the mechanism of the process. As a result, one of the silicas (1-methylpiperazine modified MCM-48) has been identified as a promising adsorbent for capturing and storage of carbon dioxide.

Modified beta-type nanosized mesoporous silicas with potential application as catalysts for the production of phenol from lignin biomass have also been investigated. The aluminosilicate matrix of zeolite type beta has been successfully characterized, along with the changes it undergoes when modified with Ni, Ru and Pt.

- *Application of NMR spectroscopy in solution for structural elucidation and study of molecular mobility of organic compounds*

Most of the activities in this direction are part of successful collaborations with other research groups. The research in this area has been carried out on a broad spectrum of structurally diverse organic compounds: series of amino acids and substituted cinnamic acids amides with adamantane derivatives, zinc phthalocyanine dyes, a chalcone produced by an enzyme-catalyzed Claisen-Schmidt condensation, and a series of trisubstituted polyhydroxy stilbenes. Yavor Mitrev has also participated in a theoretical and NMR study of the tautomeric composition of folic acid at physiological conditions. In another international collaboration, mixtures of glycerol with dimethylsulfoxide have been investigated with NMR techniques as model systems for the influence of viscosity on chemical reactivity in various reactions. In all of these projects the contributions of Yavor Mitrev are of substantial importance.

## CONCLUSION

After reviewing all documents and publications submitted by the candidate, I have no doubt that Yavor Mitrev has achieved original research results which contribute to the development of the scientific field and satisfy the requirements of the Law for the Development of the Academic Staff in the Republic of Bulgaria. The published results clearly show that Yavor Mitrev has sufficient theoretical knowledge and professional skill for the position of associate professor. In view of this, I kindly recommend the scientific jury **to approve** the application of Yavor Nikolaev Mitrev for the position of "Associate professor".

07.09.2022

Reviewer:

(assoc. prof. Dr. Plamen Angelov)