



Department of Chemical & Pharma Engineering
Sofia University "St. Kliment Ohridski"
Faculty of Chemistry & Pharmacy
James Bourchier Avenue 1, Sofia 1164, Bulgaria



REVIEW

by **Theodor Dimitrov Gurkov, Ph.D., Professor**

Department of Chemical and Pharmaceutical Engineering (DCPE),
 Faculty of Chemistry and Pharmacy, Sofia University, J. Bourchier Avenue 1, Sofia 1164

reviewer's details

of materials for participation in the competition for the position of **full professor**
 in the professional field 4.2. Chemical sciences (Physical Chemistry – Formulation of dispersions
 for cosmetics and home care applications), announced in the State Gazette No. 55 / 28. 06. 2024

scientific and educational field – as officially announced

presented by the candidate:

Associate prof. Dr. Krâstanka Georgieva Marinova

candidate's details

1. Biographical data and qualifications

Prof. Marinova was born on October 25, 1968 (she is currently 56 years old); graduated from higher education at the Faculty of Physics of the SU, 5-year (master's) specialty "Engineering Physics" in 1992. She passed a Postgraduate qualification "Separation processes in industry and environmental protection", under the European program TEMPUS, and graduated in 1994. After that she became a Ph.D. student in the Laboratory of Chemical Physics and Engineering (LCPE), Faculty of Chemistry, Sofia University (SU).

She defended a Ph.D. dissertation (for the degree "Doctor") in 2002, on the scientific specialty 01.05.05 Physical Chemistry, with the title "Mechanisms of action and exhaustion of fast antifoams". She has successively held the positions of physicist, senior assistant, chief assistant professor, and associate professor (since 2010) at the Faculty of Chemistry and Pharmacy of SU. Krâstanka Marinova is an associate professor in the scientific specialty 01.05.01 "Theoretical Chemistry (Separation processes in disperse systems)".

Prof. Marinova was on two long-term specializations abroad: (i) in the Department of Chemical Engineering at the University of Patras (Greece), for 5 months in 1993; (ii) in the Research Center of the company "Rhodia Silicones Europe", located in Lyon (France), for 6 months in 1998. She was a visiting lecturer at the University of Novi Sad (Serbia), Faculty of Technology (May 2018), and at the University of Lodz (Poland), Faculty of Chemistry (May 2022), under the CEEPUS program.

She is a member of the European Colloid and Interface Society (ECIS). She was the winner of the Istanbul University (Turkey) scientific award in 1999, for her distinguished contributions in the field of Physical Chemistry.

This rich professional biography shows that K. Marinova is a specialist with the highest qualifications and broad international experience.

2. Scientific achievements and activities on projects

We get a general impression of the scientific achievements of Associate Professor K. Marinova from the report on the fulfillment of the criteria according to the national requirements under Art. 2b from the law called „ZRASRB”, for the scientific field of Physical Chemistry, professional specialization 4.2. Chemical Sciences. 20 articles and 2 patents were submitted for participation in the competition for the academic position "professor".

Under the indicator 4 [Group V (=B, the third letter in the BG alphabet)] – Habilitation thesis - scientific publications, there are three articles in Q1 and two in Q2, a total of 115 points (with the requirement of 100 points according to the recommended criteria of FHF-SU).

According to indicators 7, 8, 9 and 10 [Group G (=Г, the fourth letter in the BG alphabet)] – publications, book chapters, patents: five articles are presented in Q1 and three in Q2. Together with the materials without quartiles, a total of 240 points are obtained (with the required 220 points according to the recommended criteria of FHF-SU).

Under the indicator 24 [Group J (=Ж, the seventh letter in the BG alphabet)] – other publications, there are six articles.

The asserted requirement that «*The candidate should be a leading scientist in a certain scientific field, demonstrated by at least 5 publications in which he /she is the first author or the corresponding author*» is fulfilled. This is evident from the list attached to the tender documents: see the papers numbered 1, 3, 8, 11, 19. A large volume of citations were found, 488 items = 976 points out of the required 120 for indicator 11, group D. The Hirsch index is $h = 20$ in Scopus ($h = 18$ in "Web of Science").

The project activity of K. Marinova is quite rich. The institutional projects (with the Research Fund of the BG Ministry of Education and Science, operational programmes and scientific networks) are described in group E - indicators 14, 16, 17. It should be noted that Assoc. prof. Marinova is the Project Leader under the contract with the National Research Fund No. KP-06-N79/4 of 05.12.2023; she

is also the coordinator and deputy project leader of the project No. BG05M20P001-1.002-0023 Competence Centre (with the Technical University in Gabrovo); in addition, she serves as the leader /coordinator of the Bulgarian team from FHF-SU in the CEEPUS network project HR-1108-07-2324. K. Marinova is also involved in six other projects with institutions.

A list of industrial projects is presented under the indicator 25 (group J). K. Marinova is the leader and co-leader of two projects, and participates in five others.

All these data prove quite unequivocally that K. Marinova is an experienced and highly qualified researcher, whose work is valuable and is appreciated in the international scientific literature. Also, Assoc. prof. Marinova is an established leader of project teams.

3. Scientific contributions

The publications for the competition are focused on three scientific areas in the field of Physical Chemistry: (1) Development and validation of new experimental methods for the determination of interfacial tension and the dilatational rheology of fluid and of solidifying interfaces between fluid phases; (2) Experimental investigation and physicochemical description of surface properties of systems with non-trivial features, such as very high surface elasticity and/or viscosity, order - of - addition dependent and temperature dependent composition; (3) Physicochemical characterization of multi-component systems with applications in cosmetics and household chemistry, incl. development of formulations for applications.

I assume that a "habilitation thesis" is the set of equivalent papers, 5 in number, designated as "Group V" (Indicator 4) from the list of papers submitted for the competition (Document 10B). The original scientific contributions are set out very clearly and in detail in a separate document; they are considered in the context of the work of other authors and the state of the art in the scientific field. The contributions need not be repeated here. We will note only some of the most important key aspects.

Task group (1): Development of a specialized procedure and instrumentation allowing synchronized pressure measurement and profiling of axially symmetric drops and bubbles over time, at small time intervals. This provides information on the stage of transition from fluid to elastic surface layers (solidification, two-dimensional crosslinking), and on the local tensor components of surface tension in anisotropic layers. This is also related to the increase in the error when applying the Laplace equation. The methodology has been used for analysis of systems containing highly viscous oils, pendant droplets of the Hydrophobin protein solution, and for the adhesion of bubbles or droplets to a solid flat surface.

Task group (2): the adsorption and the surface rheological properties of a number of specific systems were investigated and analysed: extracts of saponins, mixtures of Hydrophobin (HFB) and other surfactants with low molecular weight, and HFB mixtures with other proteins at the water/oil interface, mixtures of surfactants with fatty alcohols. The results for surface elastic and viscous

moduli are interpreted and related to the possibilities of controlling the Ostwald ripening in foams and emulsions.

Task group (3): Surface tension and rheology of adsorption layers are related to foam formation and stability of foams and foam films, in systems with co-adsorption of proteins and polymers. The wetting processes, and the mechanisms of soil removal from hard surfaces and from artificial skin are investigated; the relationship between the morphology of the deposited layers and the wetting of surfaces is revealed. Physico-chemical approaches have been applied to the preparation of disperse systems: sequential and/or parallel adsorption to stabilize microcapsules; formation of saturated micellar phases and of micellar solutions with filamentous micelles - in washing and cleaning products; cosmetic emulsions with novel oils.

My personal impressions of the candidate's work, which I have known for many years, allow me to confirm that the formulated original scientific contributions are the personal achievement of Assoc. prof. Marinova.

4. Teaching activities

4.1. Teaching courses and new M.Sc. program

Assoc. prof. K. Marinova is responsible for, and conducts the classes in, 8 courses at different Bachelor and Master majors in the Faculty of Chemistry and Pharmacy, as follows:

Separation processes in disperse systems (B.Sc. major Ecochemistry);

Programming of chemical calculations (B.Sc. major Chemistry & Informatics);

Dispersions in cosmetics and in home care applications (M.Sc. major Disperse systems in chemical technology);

Base mathematics (elective for all B.Sc. majors and for Pharmacy);

Formulation and characterization of products for hygiene and cosmetics (elective for all B.Sc. majors);

Cosmetic products as disperse systems (elective for M.Sc. Pharmacy);

Formulation of dispersions for cosmetics and home care applications (M.Sc. major KBH);

Base mathematics for chemists (M.Sc. major KBH, the long variant, 4 semesters).

In this regard, it is worth noting the fact that Associate Professor Marinova initiated and prepared the adoption and approval of a three-semester Master's program "Cosmetics and Household Chemistry" (abbreviated as KBH), which began with the first intake in the 2017/2018 academic year. In 2020, a curriculum for a 4-semester program, which is intended for "non-specialists", was proposed, and in the summer semester of the 2020/2021 academic year, the first admission was made in this educational form as well. Since its opening, the master's program has attracted at least one group of

students annually, and is among the top three master's programs in terms of number of students in the Fac. Chem. Pharm. Teachers from six departments of the FCP, as well as external teachers, participate in the students' education.

Krâstanka Marinova prepares and teaches elective courses in cosmetics and household chemistry for students in EQ Degree Bachelor and EQ Degree Master - Pharmacy, since 2017 (see the list above). Also, since 2017, she is the Head of the „KBH” master's program.

From the information presented, it is clear that the educational and teaching work is among the priority activities for Prof. Marinova, and impressive results have been achieved.

4.2. Ph.D. students and graduates

K. Marinova was the co-supervisor of three successfully defended dissertations for the Ph.D. degree "Doctor" — (i) by Rumyana D. Stanimirova (together with Prof. K. Danov), defended in 2014; (ii) of Lidia M. Dimitrova (together with Prof. P. Kralchevsky), defended in 2017; (iii) of Eng. Mihail T. Georgiev (together with Prof. P. Kralchevsky), defended in 2018. Currently, Associate prof. K. Marinova is the co-supervisor (together with Prof. K. Danov) of full-time Ph.D. doctoral student Tatyana G. Slavova, enrolled from February 1, 2023.

Assoc. prof. Marinova was supervisor and co-supervisor of 25 diploma theses in Bachelor and Master programs, at the Faculty of Chemistry and Pharmacy of SU. The complete list is attached to the documentation; from this list, K. Marinova supervised 15 diploma theses in the KBH master's program. The results of three theses have been presented at international cosmetics congresses.

5. Organizational and administrative experience, contacts with companies, activity in the field of "Cosmetics"

Associate prof. K. Marinova held the position of Deputy Dean for education - bachelor's degree and „post-graduate qualification” (SDK), at the Faculty of Chemistry and Pharmacy, SU "St. Kl. Ohridski", from 2012 to 2019.

She maintains active contacts with Bulgarian companies that develop and produce cosmetic, laundry and cleaning products for home and industry since 2016, incl. with their professional organizations, both on problems of the development of various products, and in connection with the training in the bachelor's specialties and in the master's program "Cosmetics and Household Chemistry" (KBH).

Prof. Marinova has proposed and assists in the admission of the Faculty of Chemistry and Pharmacy as an associate member of the Bulgarian National Association of Essential Oils, Perfumery and Cosmetics (BNAEMPK), from 2016. She actively participates in the activities of BNAEMPK, and from 2019 to 2023 is a member of the Control Council, and from 2023 she was elected a member of the Management Board of the Association.

K. Marinova organizes various programs for post-graduate qualification at FCP for specialists from Bulgarian companies producing cosmetic and cleaning products, with the participation of teachers from the team of the KBH master's program.

Prof. Marinova has been a member of the Association of Bulgarian Cosmetologists (SBK) since 2017, and the same year she was elected as the president of SBK. She actively participates in the activities of the SBK and supports its membership in the IFSCC (International Federation of Societies of Cosmetic Chemists), assisting in the project activity and the organization of annual seminars with lecturers from the IFSCC, as well as with lecturers from Sofia University, Plovdiv University, BAS. From 2017 to 2023, SBK members have increased from 25 to almost 100. Students from the KBH master's program are regular participants in the SBK seminars, where they learn about the latest trends in the cosmetic industry, and contact directly with Bulgarian manufacturers of cosmetics and raw materials for cosmetics.

Assoc. prof. K. Marinova helps to strengthen the contacts between the academic community of FCP and the Bulgarian cosmetics industry. She leads the implementation of several effective collaborations within the Competence Center "Sustainable utilization of bio-resources and waste from medicinal and aromatic plants for innovative bioactive products", as well as within some projects for the development of cleaning formulations.

6. Conclusion

Assoc. prof. Marinova is a distinguished scientist with excellent international prestige in the field of Physical and Colloid Chemistry (dispersions, surfactants, formulation and product applications). The scientific results described above and in the competition materials, and their publication in leading scientific journals in the field (specifically, eight publications in Q1 quartile journals, five in Q2, in the list of 22 scientific papers submitted for the competition), underline the high professional level of her research. The candidate's qualities as a highly committed teacher and active participant in the organization and management of teaching work in the CPE Department and in the FCP are unquestionable. I would also note here the positive effect of Assoc. prof. Marinova's efforts in the cosmetology field - this is essential for the training of personnel (including in SDK), as well as for the external contacts of the Faculty with related organizations.

All of the above gives me grounds to confidently recommend to the esteemed Scientific Council of the Faculty of Chemistry and Pharmacy at Sofia University to elect Assoc. Prof. Dr. Krastanka Georgieva Marinova for the academic position of "Full Professor" in the Professional Field 4.2 Chemical Sciences (Physical Chemistry - Formulation of dispersions for cosmetics and household chemistry).

REVIEWER:

(Prof. Dr. Theodor D. Gurkov)

Sofia, the 04-th of November, 2024