

History of the Department of Chemistry, the University of Niš, Republic of Serbia

Danijela Kostić

University of Niš, Faculty of Natural Sciences and Mathematics, Department of Chemistry,

Višegradska 33, 18000 Niš, Republic of Serbia, e-mail: danijelaaakostic@yahoo.com

ABSTRACT

Department of Chemistry was founded in 1971. In its long history, it became famous in Serbia and abroad because of the success and skills of its undergraduates, graduate students, and PhD-students. At the Department of Chemistry, since the founding, in addition to teaching, fundamental and applied researches were carried out in various fields of chemistry. Scientific activity was accomplished through many projects funded by the Republic of Serbia and international projects and within the framework of the Institute of Chemistry. Up to the end of 2017, a more than 1000 students graduated at the Department of Chemistry. Starting from the school year 2005-2006, previous Diploma of high education has been equalized with Master's degree. One hundred and ten master theses and 105 doctoral dissertations were defended (41 according to the new accredited program). Under the new Bologna program, 160 students received bachelor's degrees and 96 master's degrees. Graduated chemistry professors have made a great contribution to the development of education in Serbia also contributing to the development of the chemical industry in Serbia, and it is worth mentioning that many of them are very successful in working abroad. Masters and PhDs of Chemistry are employed at many faculties and colleges in Serbia and abroad. Many of them are authors of a large number of scientific papers published in renowned world scientific journals.

Keywords: *history, Department for chemistry, University of Niš*

Teaching chemistry at the High Pedagogical School in Niš-beginning of study of chemistry on higher level

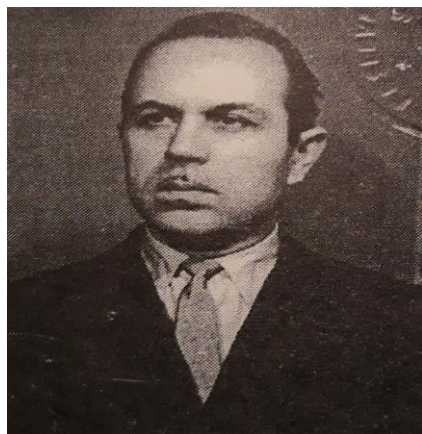
The High Pedagogical School in Niš was founded in 1948-1949 in order to educate the teaching staff (Figure 1). Chemistry was studied within three-subject (Physics-Chemistry-Mathematics) group. The group of physics-chemistry-mathematics, due to the development of the elementary education system, was transformed in 1954 into three groups: chemistry-physics,

physics-chemistry and mathematics. In accordance with this division, an adequate allocation of teaching staff was carried out within these groups.



Figure 1. Teaching staff in front of High pedagogical school in 1962 (Kerković and Ćirić, 2002).

Stanimir Arsenjević and Radmila Radovanović (Figure 2) were the first professors who were appointed in 1948/1949 for chemistry teaching. Professor Arsenjević lectured General, Inorganic, Analytical and Organic chemistry to the first generation of students, while Radmila Radovanović lectured General and Inorganic Chemistry to the second generation of students.



Stanimir Arsenijević



Radmila Radovanović



Čedomir Arsić

Figure 2. Chemistry professors at High Pedagogical school (Kerković and Ćirić, 2002)

In 1960, Professor Mirjana Canić was appointed, who, in addition to the theoretical teaching of General and Inorganic Chemistry, performed demonstrations and exercises and organized professional trips for students, linking theory with practice. Professor Čedomir Arsić (Figure 2) was elected in 1963 for teaching of Organic Chemistry and Methodology of Chemistry.

The initial working conditions were difficult, due to the lack of apparatus, as well as the lack of teaching and technical staff. With the efforts and enthusiasm of Prof. Stanimir Arsenijević and Radmila Radovanović, the difficulties in working within the chemistry-physics group were gradually eliminated. In the renovated premises in 1954, the first chemical laboratory was established with water and gas connections, with shelves, chemicals, well-equipped workplaces. Laboratory for experiments and exercises in chemistry contained 40 places and was an exemplary teaching base for chemistry studies and was one of the best, at that time, in the country among colleges. The first lab technician, Mihajlo Nešić, was employed in 1963.

In 1951, Stanimir Arsenijević founded the Serbian Chemical Society branch in Niš, which organized expert and scientific lectures by eminent chemistry professors.

The High pedagogical school in Niš worked from 1948 to 1971. In that period, 146 students graduated (Kerković and Ćirić, 2002).

Teaching chemistry at the Faculty of Philosophy in Niš

Chemistry at the Faculty of Philosophy began in November 1971 and was carried out in the premises and laboratories of the Higher Pedagogical School which stopped working. The chemical group thus had initial conditions for successful further development.

Lectures were conducted by temporarily employed professors, such as dr Milan Muškatirović, dr Darko Šepa and dr Ivan Stamenković. Afterwards, professors like Slobodan Vukotić and assistants Todor Pecev, Gordana Miletić, Stevan Miletić had permanent contracts. Since its founding, the Study group of chemistry consisted of three departments: the Department of Inorganic Chemistry, the Department of Analytical Chemistry and the Department of Organic Chemistry.

In 1978, postgraduate studies were introduced for the academic title of Master of Science. The courses of master's studies were: Inorganic Chemistry, Organic Chemistry, Analytical Chemistry and Course of Chemistry. For each direction, the curriculum and method of carrying out teaching and taking the exams were determined. Master's studies lasted two semesters and they were assumed to be finished after all passed exams and defending of the master's thesis, which was the result of the independent scientific work. In the period from 1978 to 1995, 119 postgraduates were enrolled, out of which 45 defended master's theses.

Specialistic studies were introduced at the Chemistry Group in 1980. There was only one direction for chemistry specialists.

A significant form of scientific research is around the creation and defense of the doctoral dissertation. At the Faculty of Philosophy in Niš, doctoral studies were introduced in 1972. At the beginning of the Chemistry Group, as it was mentioned before, there was not enough teaching staff, as well as other conditions necessary for this type of study, so the first doctoral dissertation in chemistry was defended in 1984.

At the end of 1995, 8 full professors, 3 associate professors, 2 assistant professors, 10 teaching assistants and 9 assistant trainees were working at the Department of Chemistry. From the founding until the end of 1995, 601 students of chemistry graduated, of which 238 males and 363 females. In the period from 1984 to 1995, 11 doctoral dissertations were defended at the

Faculty of Philosophy. The Institute of Chemistry was founded in 1996 and its aim is the organization of scientific research.

Research activity at the Department of Chemistry

Professors and assistants were working on 20 projects. Projects where chemists from our Department were leaders are:

1. Chemical and phytochemical investigations of herbs from the territory of the South-East Serbia (leader of the project: professor Dr Radosav Palić);
2. Application of the modern instrumental methods in natural, medical and other investigations (leader of the project: professor Dr Rangel Igov);
3. Application of physico-chemical methods for the control of waste industrial waters and input chemicals in the process of the production of leather and fur (leader of the project: professor Dr Milovan Purenović);
4. Development of current and the introduction of novel technologies into the processing of aluminum surfaces (leader of the project: professor Dr Milovan Purenović);
5. Technology of the production of the electrochemically active microalloyed aluminum (leader of the project: professor Dr Milovan Purenović);
6. Colored coatings of anodic oxidized aluminum (leader of the project: professor Dr Milovan Purenović);
7. Investigation and the development of auxiliary dyes with the aim of the replacement of imported colors (leader of the project: professor Dr Milovan Purenović);
8. Development of new methods for the characterization of tobacco raw material and main stream of cigarette smoke with the aim of the production of quality and less harmful cigarette (leader of the project: professor Dr Blaga Radovanović);
9. Balances in complex environments, within the subproject "Study of the nature, structure and origin of chemical species in natural environments" (1995-2000) funded by the Ministry of Science and Technological development, Republic of Serbia (project leader: professor Dr Pavle Premović);

10. Development of new analytical methods for the analysis in samples of natural and artificial origin in aquatic and non-aquatic environments, Ministry of Science, Technology and Development of the Republic of Serbia (1996-2000) (project leader: professor Dr Rangel Igov);
11. Development of new methods for determining low concentrations of substances in real samples (1995-2000) funded by the Ministry of Science and Technological development, Republic of Serbia (project leader: professor Dr Mirjana Obradović).

Chemists from this Department was also leaders on the following sub-projects:

1. Investigation of organic and inorganic structures in rheological materials (subproject leader: professor Dr Pavle Premović);
2. Spectroscopic investigations of any kind in natural surroundings: natural structure and the origin (subproject leader: professor Dr Pavle Premović).

The members of the chemistry group co-operated on 10 other scientific projects (Zaječaranović, 1996).

Teaching chemistry at the Faculty of Sciences and Mathematics in Niš

After the accreditation of the faculty with programmes according to Bologna declaration (http://www.bolognabergen2005.no/Docs/00_Main_doc/990719BOLOGNA_DECLARATION.PDF; <http://www.parlament.gov.rs/content/lat/akta/zakoni.asp>) that was completed in 2008, at the Faculty of Sciences and Mathematics in Niš, education are organized in three levels:

1) Bachelor's level (the first cycle)

This level is the beginning of a course or programme in the subject area and does not require previous studies at the university and is for beginners in higher education. The program at the bachelor's level at Department of chemistry is 3 years of full-time studies in length with 180 credits.

2) Master's level (the second cycle)

Master academic studies last 2 years. The combined total duration of a bachelor's and a master's studies is 5 years, or 300 ECTS. Master's programmes always include a thesis, and unfortunately

only a formal presentation. Students who complete a master's programme are awarded the degree of Master of chemistry.

The Master Chemistry program has the following directions:

- General Chemistry
- Applied Chemistry.

In the direction of General chemistry there are modules:

- Research and Development
- Professor of Chemistry

In the Applied chemistry direction there are modules:

- Applied Chemistry
- Chemistry of the Environment

3) Doctoral level (the third cycle)

The prerequisite for the studying of the doctoral level is that the candidate must complete a degree at the master's level.

Today, at the Faculty of Sciences and Mathematics, the doctoral studies last three years and are conducted under the supervision of usually one mentor. Three-year PhD program has been introduced in 2006 with 8 exams which are all picked from a list of accredited courses and 5 study researches. As mentioned before, the work on PhD theses is carried out under the guidance of a mentor selected from a pre-determined list, and dissertations are defended upon the publication of two papers in journals ranked as M20 (classification according to Ministry of Science, Education and Technological Development of Republic of Serbia).

Since 2011, the defended PhD theses are available on the faculty website in electronic form. Upon completion of the doctoral studies program, a candidate is awarded a PhD in natural science-chemistry. Until the end of 2017, 103 PhD theses have been defended, 39 of which have been defended since 2006.

Workspace

The Department of Chemistry occupies 1930.5 m² (811.8 m² classrooms, 177.2 m² computer rooms, and 667.4 m² laboratories). There are appropriate techniques for teaching: graphoscopes, video screens and laptops, and interactive board that enables contemporary teaching. For carrying out laboratory exercises and practical teaching of students, modern equipments and instruments are available. A large number of personal computers on academic networks that allows searching of chemical databases are available to the chemistry students.

The library

The Library of the Higher Pedagogical School was established in 1950 and had 19070 books and a considerable number of different journals (around 2000). The Faculty of Philosophy inherited a library from the Higher School of Pedagogy. The book fund has been increased over time and in 1995 it included 46768 books, of which 1410 books in the field of chemistry, with a large number of domestic and foreign journals. The Faculty of Sciences and Mathematics has inherited from the Faculty of Philosophy textbooks and magazines in the field of chemistry. The library fund was enriched with the purchase of contemporary editions, donations of professors and former chemistry students and editions published by professors and associates from the Department of Chemistry. The library now contains 3400 book titles from various fields of chemistry, and numerous hard copies of the journals. Today, for most subjects, there are textbooks and books of exercises whose authors are professors and associates employed at the Department of Chemistry.

Department of Chemistry publishes two scientific journals: **Chemia Naissensis**, and **Facta universitatis, series: physics, chemistry and technology**.

Teaching staff

Currently, there are 31 professors and two assistants at the chemistry department. Additionally, the students of doctoral studies are engaged in teaching, and for practicals technicians and professional associates.

Research activity at the Department of chemistry until 2011

In the period from 2000, teachers and associates of the Department of Chemistry participated in the realization of the following scientific projects, which were led by professors from the Department of chemistry.

1. Physicochemical characterization of heavy metals in structures of synthetic minerals of clay, natural minerals of clay and clay of industrial and ecological significance from the area of wider Serbia (2000-2005) funded by the Ministry of Science and Technological Development, Republic of Serbia (project leader prof. Pavle Premović);
2. Development of new and improvement of existing analytical methods for monitoring the quality of industrial products and the environment (2000-2005) funded by the Ministry of Science and Technological Development, Republic of Serbia (project leader prof. Snežana Mitić);
3. Development and application of methods for monitoring the quality of industrial products and the environment (2006-2010) funded by the Ministry of Science and Environmental Protection, Republic of Serbia (project leader prof. Snežana Mitić);
4. Investigation of chemical composition and bioactivity of secondary metabolites of plants species from genera *Achillea*, *Acinos*, *Artemisia* and *Calamintha* (2002-2005) funded by the Ministry of Science and Environment Protection, Republic of Serbia (project leader prof. Radoslav Palić);
5. Secondary metabolites: biological and antioxidant activity (2006-2010) funded by the Ministry of Science and Environmental Protection, Republic of Serbia (project leader prof. Radoslav Palić);

6. Innovation, monitoring and reconstruction of technical-technological system for refinement of alkali, cyanide and acidic wastewaters, which contain Cr, Ni, Cu, Zn, Sn and Cd, funded by: Ministry of Science and Technological Development, Republic of Serbia (project leader prof. Milovan Purenović);
7. Improvement of chemical-technological processes and system reconstruction in electronic tubes manufacture (2005-2008), funded by: Ministry of Science and Technological Development, Republic of Serbia (project leader prof. Milovan Purenović).

International project:

8. European Union [FP7-REG-POT-2007-3-01]; KBBE: Food, Agriculture and Biotechnology project "CHROMOLAB-ANTIOXIDANT" [204756]; EU 2008-2011 (participant)

Professors who were working at Department of Chemistry

Professors with permanent employment at Department of Chemistry were: 1) dr Slobodan Vukotić (1971-1979), professor in Analytical chemistry; 2) dr Stevan Lajšić (started 1977 with teaching in Chemistry of natural products, dean of the Faculty of Philosophy (1979-1981), and then moved to Novi Sad) (Figure 3) and 3) dr Stojan Stojković, professor in Physical Chemistry who were at University of Niš couple of years, and then moved to Belgrade.



Figure 3. Dr Stevan Lajšić (<https://www.filfak.ni.ac.rs/fakultet/dekani-i-prodekani>)

Because of the insufficient number of professors the following people were employed (up to 1/3 of the time): dr Bogdan Stanić, dr Srbobran Rajić, dr Lidija Pfindt, dr Bojana Grujić Injac, dr Jovan Vučetić, dr Konstantin Popov, dr Miljenko Perić, dr Slobodan Sukdolak, dr Milorad Cakić, dr Petar Ilić, dr Lazar Đorđević, dr Aleksandar Jokić, dr Milorad Jeremić, dr Slobodan Milosavljević, dr Petar Petrović, dr Mijat Malinar, dr Mile Novaković, dr Velibor Mitić and associate Dragan Lazarević.

Professors that retired:

1. Pavle Premović, full professor from 1988
2. Rangel Igov, full professor from 1989 (died)
3. Radoslav Palić, full professor from 1993
4. Miloje Rakočević, full professor from 1994
5. Todor Pecev, full professor from 1994 (died)
6. Stevan Miletić, full professor from 1995 (died)
7. Gordana Miletić, full professor from 1995
8. Milovan Purenović, full professor from 1995
9. Jasna Ursić Janković, full professor from 1999
10. Đorđe Glišin, associate professor from 1992 (died)
11. Blaga Radovanović, full professor from 1997
12. Jelica Perović, full professor from 2003 (died)
13. Ružica Nikolić, full professor from 2003

Teaching assistants and professors that were employed at The Department of Chemistry, and then left:

-
1. Ivan Ivanov, teaching assistant
 2. Olivera Kitanović, teaching assistant
 3. Natalija Miladinović, teaching assistant
 4. Nebojša Simić, associate professor
 5. Anđelković Slobodan, teaching assistant
 6. Miroslav Premović, teaching assistant
 7. Dejan Dulanović, teaching assistant
 8. Momčilo Vidaković, teaching assistant

9. Biljana Arsić, teaching assistant
10. Aleksandra Živković, teaching assistant

Unfortunately, Biljana Popović, who was working together with professor Pavle Premović died.

As associates in teaching were:

1. Drenka Zeljković, responsible for giving practical exercises in analytical chemistry to students (died)
 2. Ljubomir Ignjatović, technician (died)
 3. Sima Stoimenov, chemicals keeper
 4. Dragica Lazarević, technician
 5. Petra Cvetković, technician
 6. Jovan Jovanović, technician
-

Conclusion

The Department of Chemistry educated over 1000 graduated chemists, 110 MSc and 64 PhDs. According to the new study program, 160 bachelor students, 96 master students and 41 doctors of science graduated from the study program. Teachers, associates and students of the Department of Chemistry participated in the realization of a large number of domestic and international scientific projects and they are authors of a large number of scientific papers. Graduated students of chemistry, masters and doctors of science have greatly contributed to the development of education and industry in Serbia and abroad.

References

Bolonjska deklaracija (1999)

http://www.bolognabergen2005.no/Docs/00_Main_doc/990719BOLOGNA_DECLARATION.PDF. Accessed 01.12.2010.

<https://www.filfak.ni.ac.rs/fakultet/dekani-i-prodekani>

Kerković, A., Ćirić J. (2002) Viša pedagoška škola u Nišu. Niš: Univerzitet u Nišu, Filozofski fakultet.

Narodna Skupština Republike Srbije (2005) Zakon o visokom obrazovanju.

<http://www.parlament.gov.rs/content/lat/akta/zakoni.asp>. Accessed 01.12.2010.

Zaječaranović G. (1996) Filozofski fakultet u Nišu 1971-1996. Niš: The Faculty of Philosophy in Niš, Izdavačka jedinica Univerziteta u Nišu,.