



DIVISION OF CHEMICAL EDUCATION

CZECH CHEMICAL SOCIETY



## Chemical Society Annual Report to the EuCheMS Division of Chemical Education for 2014-2015

### 1. Abstract

In 2014/15, Division of Chemical Education of the Czech Chemical Society participated in chemical education activities in the Czech Republic and abroad.

The main activities were the organization of two conferences and one seminary; participation of our members in six conferences abroad; cooperation with universities, secondary schools and primary schools; participation in the realization of chemistry teachers' courses and Chemistry Olympiad in the Czech Republic.

### 2. National educational policy

#### *Primary and secondary education*

The project on assessment of upper-secondary school students: National School-Leaving Examination (Chemistry was one of the subjects to choose from) finished for Chemistry and other Science subjects in 2013. National School-Leaving Examination currently only includes the following subjects: Czech language and foreign language or mathematics.

A new project is the national exams at the end of lower secondary education, which, however, should once again only consist of solely Czech language and Mathematics.

The new framework of educational programme of science education on primary and secondary schools (Biology, Chemistry, Physics, Geography) came to schools. School educational programmes were prepared in the school years 2007/08-2001/12, so now almost all primary and secondary schools in Czech Republic teach based on the new framework educational programmes. The problem is that these curricular documents are very general and don't bring necessary change in the majority of schools.

#### *Tertiary education*

A two-degree study programmes, i.e. to split the study programmes into bachelor (3 years) and master (2 years), for education of chemistry pre-service teachers is now in its 11th year in Czech Republic. It has to be said that the interest in studying chemistry teaching is lower than ten years ago. The structure of the study programmes is also causing problems; the bachelor programme mostly teaches just the chemistry disciplines while the magisterial programme teaches pedagogy, psychology and didactics of chemistry so the continuity of the two degrees of study is problematic.

A PhD study programme (4 years) is designed to develop concept issues related to the education in respective subjects in accordance with current European trends. 48 students continued in their study in school years 2014/15, it means 42 students at Charles University in Prague – Faculty of Science, two students at Palacký University Olomouc – Faculty of Science and four students at University of Hradec Králové – Faculty of Science.

### 3. Events in chemical education

#### *66th Conference of Chemical Societies - Chemical Education and History Section*

Organized by Association of Chemical Societies in Ostrava (Czech Republic) from the 7th to 10th of September 2014 (22 participants from the Czech Republic and Slovakia).

#### *3rd Market of Ideas of Chemistry Teachers – national conference*

Organized by the industrial upper-secondary chemistry school in Brno from 10th to 11th of October 2014 (65 teachers, including 22 active speakers from the Czech Republic).

#### *23th International Conference of Chemical Education and 8<sup>th</sup> IOSTE Symposium for Central and Eastern European Countries*

Organized by the Faculty of Science Hradec Kralove University in Hradec Kralove from 15th to 17th of September 2014 (85 participants from Czech Republic, Slovakia and Poland and 12 other European countries).

#### *10th International Seminary for PhD students*

Organized by the Pedagogical Faculty University in Trnava (Slovak Republic) from 20th to 21st of November 2014 (35 participants from Czech Republic, Slovakia and Poland).

### 4. Activities of Division of Chemical Education in the Czech Chemical Society

The committee of Division has 11 members, chair is Prof. Hana Ctrnactova, vicechair is Prof. Martin Bilek and secretary is Dr. Vladimír Sirotek. The activity of Division was appreciated by Czech Chemical Society very good. The members of Division worked in all mentioned above activities, it means new programme and new assessment of primary school pupils, new programmes and credit system and PhD studies in tertiary education, organization of events in chemical education for in-service teachers and secondary school students, etc.

### 5. Publications

BÍLEK, M. (ed.) *Research, Theory and Practice in Chemistry Didactics: Research and Research Oriented Studies*. Proceedings of the 23<sup>rd</sup> International Conference on Chemistry Education. Gaudeamus, Hradec Králové 2014. 249 p. ISBN 978-80-7435-415-1.

BÍLEK, M. (ed.) *Science and Technology Education for the 21st Century: Research and Research Oriented Studies*. Proceedings of the 9<sup>th</sup> IOSTE Symposium for Central and Eastern Europe. Gaudeamus, Hradec Králové 2014. 313 p. ISBN 978-80-7435-416-8.

ČTRNÁCTOVÁ, H.: *Science Education in Primary and Secondary Schools in the Czech Republic*. Editors: O. M. Čorosova, R. E. Gerosimova, L. E. Mančurina, N. I. Zacharova In: Humanitary education as an imperative of the civil society development. North-Eastern Federal University, Yakutsk 2014, p. 10-15. ISBN 978-5-7513-1980-9

RUSEK, M., STÁRKOVÁ, D., METELKOVÁ, I. (ed.) *Projektové vyučování v přírodovědných předmětech (Project-based education in science education)*. Proceedings of the 12<sup>th</sup> International student's conference. Charles University, Prague 2014, 136 p. ISBN 978-80-7290-817-2

NODZYŃSKA, M., KOPEK-PUTAŁA, W. (ed.) *Profits and Limitations of Inquiry Based Science Education (monograph)*. Pedagogical University, Kraków 2014, 68 p. ISBN 978-83-7271-882-2

STUHLÍKOVÁ, I., JANÍK, T. et al. *Oborové didaktiky: vývoj–stav–perspektivy (Didactics of subjects: history–current state–perspectives)*. Masaryk University, Brno 2015, 466 p. ISBN 978-80-210-7769-0.

#### **6. Liaison with the chemical industry**

In the school year 2014/2015, our cooperation with the companies oriented to scholastic products continued. This included resellers of products of Vernier, Pasco, Promethean, Smart Technologies, AV-media, Profimedia, Edufor – suppliers of sensors and accessories, educational tools etc., to some extent development and modifications of units. There is also a collaboration with Czech producing companies in Mariánské Lázně (plastics processing) and in Brno (building materials production) – knowledge support, helpful in development and modifications of units, discussions, excursions; Veolia Water, Veolia Environment (PVK, Museum of water treatment) - development and modifications of units; SÚRAO – State institution for treatment of radioactive waste repository – excursions, knowledge support, discussions; National technical museum and Scientica Agency - knowledge support, discussions, IBSE resources and concepts.

#### **7. International and European initiatives**

In 2014/15, the members of the Division of Chemical Education in the Czech Chemical Society were participating in solving the European projects MASCIL and TEMI.

They were actively participating as members of the scientific committee of ECTN (Krakow – Poland, January 2015, Ljubljana – Slovenia, April 2015) and DidSci (Krakow – Poland, June 2014).

#### **8. Other events and activities**

In 2013, there was an extensive questionnaire survey for all faculties in the Czech Republic that prepare chemistry teachers; the questionnaires were gathered throughout October/November 2013 and from December 2013 to March 2014 they were evaluated. A case study with the results was put together.

A seminary in June 2014 informed the representatives of all faculties about the results. The questionnaires and their results proved to be a good incentive to improve the teacher preparation in the Czech Republic. The expert group of the Accreditation Commission was informed in September 2014.

Based on the results achieved in the individual subject didactics, including this questionnaire survey, a comprehensive monography about the development, current state and perspectives of the subject didactics in the Czech Republic was written. Hana Čtrnáctová and Martin Bílek are the authors of the chapter "The Didactics of Chemistry – Development, Current State and Perspectives".

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