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## Chemistry Olympiad

Swiss Association of Science Teachers

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## The 41st International Chemistry Olympiad in Oxford, Great Britain

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The 2009 Chemistry Olympiad took place in Cambridge and Oxford (England) July 18<sup>th</sup> to July 27<sup>th</sup>, with 65 nations and 261 students. Switzerland was represented by four candidates: Jan Bütikofer, 3303 Jegenstorf ZH; Tino Canziani, 8165 Oberweningen ZH; Virginie Greppin, 4153 Reinach BL; Tibor Stolz, 8188 Pfaffhausen ZH. This team was entirely German speaking, in contrast to previous years, where at least one candidate came from the Latin part of Switzerland. The mentors were: Dustin Hofstetter, ETHZ; Nina Zargari, EPFL; Yves Aeschi, Universität Bern.

Cambridge welcomed the teams with a rather international atmosphere: students from all over the world had invited their relatives to come. There was a sense of adventure and a taste of novelty in the air, which boosted the students' expectations for the ten days of contest.

In fact, the students spent only ten hours at the contest itself, five hours for each of the practical and the theoretical exam. The remaining time was devoted to ceremonies, visits, social activities and for preparing the tests. After having visited the labs, the mentors moved to Oxford and the students stayed in Cambridge.

In Oxford, the mentors discussed, adapted and translated the problems proposed by the organisers. Some late-night sessions of both mentors and organisers were necessary to correctly bundle and distribute the documents in all languages. Meanwhile the students got to know local traditional culture, such as punting on the river Cam, as well as newer cultures like go-ape.

The tasks were of midrange difficulty. The practical exam dealt with an environmentally friendly and solvent free aldol condensation, which could be executed without a hood. Furthermore, a Cu(II)-complex had to be analyzed: Cu(II) was titrated with EDTA, and chloride ions by silver ions with dichlorofluorescein as an indicator. The third task involved determining the critical micelle concentration of sodium dodecylsulphate (SDS) by measuring its

conductivity. This task was completely novel by the way the instructions were given:

*Task 3 – The Critical Micelle Concentration of a Surfactant*

You are provided with approximately 4.3 g SDS, accurately pre-weighed in a vial, a 250 cm<sup>3</sup> volumetric flask, a 50 cm<sup>3</sup> burette, 50 cm<sup>3</sup> bulb pipette, a conductivity meter, conductivity solution (used only for calibration), and a tall plastic vessel.

You need to measure the conductivity in mS cm<sup>-1</sup> at various concentrations of aqueous SDS (*c*, up to 30 mmol dm<sup>-3</sup>).

The novelty was that the student had no other instruction about the concentrations to be used. Nevertheless, the students were given a graph paper with the desired range. So the different information had to be put together and the experiment had to be planned before being undertaken. The Swiss mentors welcomed this change warmly.

In the theoretical exam, a wide range of subjects were covered going from the interstellar formation of dihydrogen gas to the total synthesis of Amprenavir, an AIDS drug. Particularly, among the six tasks was the reconstruction of Alfred Werner's work at the University of Zurich in the determination of the geometry of complexes with six ligands. The students had to determine the number of isomers and the composition of some complexes by means of original element analysis data. Of course, we felt rather honoured by this particular choice of task. Further information about the tasks and the Olympiad can be gathered from <http://www.icho2009.co.uk>.

The final medal ceremony concluded the Chemistry Olympiad. The first three rankings went to students from China, Israel and Taiwan. The Swiss delegation achieved one honourable mention (Tino Canziani). This distinction was given to students having just missed the medal ranges: gold for being ranked within the top 10%, silver within the next 20% and bronze within the next 30%. Nevertheless, all participants appreciated the Olympiad as a very valuable and fruitful experience they would not want to have missed at any price.

The next Swiss Chemistry Olympiad has started in September 2009 with the first round, a multiple-choice test. All the necessary information can be downloaded from <http://www.swisscho.ch>. The Swiss Chemistry Olympiad is part of a network of scientific Olympiads ([www.olympiads.ch](http://www.olympiads.ch)) and would like to thank all people involved for their work and all the partners for their substantial support.

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The Swiss Team: Tino Canziani (student, ZH), Nina Zargari (mentor, VD), Sebastian Keller (guide, AG), Jan Bütikofer (student, BE), Yves Aeschi (scientific observer, AG), Virginie Greppin (student, BL), Dustin Hofstetter (head mentor, ZH), Tibor Stolz (student, ZH).