



Opening ceremony in the Martinikerk

Although the Olympiad had already taken off furtively on Friday, the official opening ceremony took place yesterday, in the Martinikerk in the center of the city of Groningen. After a musical contribution by the Frysk Wind Ensemble, the president of the 34th International Chemistry Olympiad, Wout Davids, welcomed the participants, mentors, and guests. In his speech, he also thanked industry, the city council, and the university for their support. He likened them to the pillars of the house that is the IChO. "Old Grey" concluded with these wise words: "There is still a lot to discover in Chemistry, both with our hands and with our brains."

After this word of welcome, all countries were presented. One member of each delegation carried the flag of their country to the rostrum. After greeting the audience, they placed the flags side by side in the flag stands.

After a musical interlude, the Rector of the University of Groningen, Doeko Bosscher, addressed the participants. He invited all these up-and-coming top chemists to come and study in Groningen next year.

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The flags in the Martinikerk

Fifty years of goat's milk production

Life without polymers is hardly imaginable nowadays, but these substances have only become plentiful after the Second World War. In 2002, DSM celebrates the 50th anniversary of its manufacture of caprolactam, the raw material for nylon. DSM, a Dutch multinational company, is the current world market leader in the manufacture of this best known of all polymers. Literally, "caprolactam" means "goat's milk."

There have probably been few inventions whose first application was so conspicuous as nylon. On the eve of the Second World War, the nylon stocking — based on an invention by W.H. Carothers, an American chemist employed by the DuPont chemical company — made the nylon polymer world-famous overnight.

Carothers made his discovery when searching for synthetic macromolecules that would have similar properties as wool and silk. In 1930, his



research led to the discovery of substances characterized by an amide link between the monomer components: the CONH link. This link occurs in many natural substances (polypeptides), for example hairs and muscle fibers, but also in hormones, tendons, and structural materials. Starting

from ϵ -aminocaproic acid ($\text{NH}_2 - (\text{CH}_2)_4 - \text{COOH}$), he created a polymer which — when used with a new spinning technique — could easily be made into long fiber strands. In a later stage, hexamethylenediamine and adipic acid were used as basic materials:

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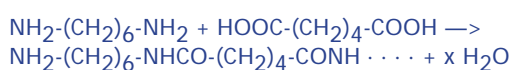
In the limelight

Japanese observers

The three Japanese observers Atsunori Mori, Masato Ito, and Yoshihiko Noda have just arrived in Eernewoude, where the mentors, observers, and guests will stay next week. They are positive about the IChO: it is an exciting event that appears much bigger now than they had imagined back in Japan. The various pieces of music during the opening

ceremony, and especially the vocal intermezzo, were also very impressive. They praise the laboratory for the practical exams: it is very spacious and clean. Japan already has a national Chemistry Olympiad. The first round will take place at the end of July with around 1250 students participating, the second at the end of June with the 60 qualifiers from the first round. In 2003, Japan will participate in the IChO for the first time.

>> Caprolactam



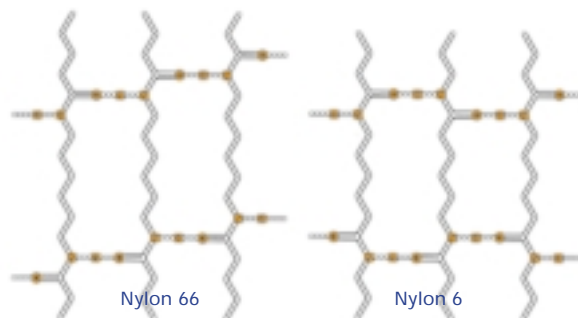
At roughly the same time American chemists were developing nylon, Dr Paul Schlack of IG Farben in Germany succeeded in creating a similar product (on 28 January 1938). This polymer was given the name of Perlon; it is currently known as nylon-6. Schlack used ϵ -caprolactam as his basic material. This substance had been produced for the first time in a laboratory forty years earlier, in 1899.

Nowadays, caprolactam is produced by converting cyclohexane or phenol via cyclohexanon to cyclohexanonoxim and then heating this intermediate in sulphuric acid. This chemical reaction is known as the "Beckman rearrangement."

The name "nylon" currently designates a whole range of materials. Each of these products is characterized by a number at the end of its name. Nylon 66 is the name of the product first marketed by Dupont in 1939; it is still the main type of nylon produced in the United States. Conversely, manufacturers in Europe — among them market leader DSM — produce high quantities of nylon-6. Worldwide, too, nylon-6 is the "biggest" nylon, with a market share of 60%. All nylons-X have been manufactured, from nylon-2 to

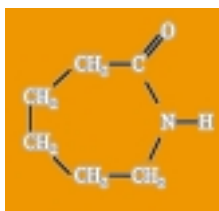
nylon-11. Some of the properties in which they differ are their melting points and the way in which they absorb moisture. The main properties of all nylons are high tensile strength, high melting point, environment-resistant, elastic, low moisture absorption, and low density.

Apart from stockings, the first applications of nylon included toothbrushes, tents, and



ropes. In wartime, nylon soon became popular with manufacturers of parachutes. Both the parachute fabric and the parachute ropes can be made of this light and strong material. Parachutes left behind by paratroopers in war zones were gratefully recycled and turned into clothing by the destitute population. Nylon is currently unrivalled in its number of applications, which included textiles, carpets, industrial fibers, engineering plastics, and film.

The current interest in sustainable usage, incidentally, has brought the possibilities of recycling nylon-6 to the fore again, since in principle nylon-6 is fully recyclable. One example of the reuse of nylon-6 is the recycling of carpets. It is possible to reclaim the raw material caprolactam from old carpets. DSM has even opened a carpet-recycling factory in the United States. The company has also developed a logistic system for the collection and transportation of these carpets. In the long term, it may be that more caprolactam will be obtained from renewable sources. And who knows, maybe this raw material for nylon will one day be as environmentally friendly as real goat's milk.



Caprolactam

Tomorrows program

Monday 08 July 2002

MENTORS / SCIENTIFIC OBSERVERS

09.00-10.00 Breakfast at hotel
10.00-16.00 Lake-tour Friesland
16.00-1830 Consultation with authors
Theoretical Examination
19.00 Dinner at hotel
20.00-24.00 Second Jury Meeting

STUDENTS

07:00 Early breakfast at Hotel
08:00 Departure for Groningen-University
09.00-14.00 Practical Examination
16.00-17.30 Sport activities
17:30 Departure for Zuidbroek
18:30 Dinner at hotel
20:00 Lecture on Chemistry

GUESTS

09.00-10.00 Breakfast at hotel
10.00-16.00 Lake-tour Friesland
18:00 Dinner at hotel
19.00-23.00 Excursion to Nij Beets

>> Openingsceremonie



Wout Davids

Jan Apotheker, the chair of the organizing committee, then invited the captain of the Dutch delegation, Hendrik Moons, to take the Pledge of Academic Conduct. To conclude the ceremony, he opened the 34th IChO officially by raising the flags.



Fortunately, he realized that their home countries also need them badly! The mayor of Groningen, Jacques Wallage, stated that Groningen has a long tradition of international openness. After hosting the Paralympics and the start of the Giro d'Italia just recently, Groningen now has the privilege to welcome the Chemistry Olympiad in its midst. He seconded Mr Bosscher's idea that "however important science is, you should also enjoy yourself once in a while." Prof. Zwanenburg, the chair of the Scientific Committee of the 34th International Chemistry Olympiad, explained that he felt it both an honor and a challenge to draw up the tests for the IChO. These assignments will be highly appropriate to the motto of the 34th IChO: "Chemistry and the quality of life go hand in hand."

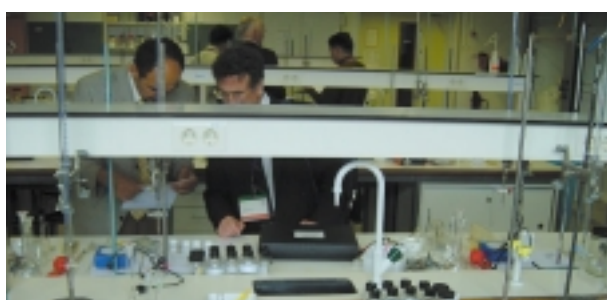


Jan Apotheker en Hendrik Moon

Laboratory Inspection



The mentors of the participating teams have inspected the laboratories to check if everything is ready for the practical examinations of their teams.



The lab setups seem challenging, to say the least, but will hopefully also appeal to the students who will have to use them on Monday...

Domino

In the evening, the delegations use the videocassettes to set up a domino project that will be a symbol of their country. As can be expected, things do go wrong occasionally...

Besides these national projects, all teams join hands to create a masterpiece for the grand finale. Highly conducive to integration, of course...

...and this is the final result!



The youngest participant



Gabriël Isar is 6 months old and without doubt the youngest IChO participant; he is Iceland's secret weapon.

The motto of the 34th IChO

Chemistry is not just an activity undertaken in laboratories. No, chemistry is everywhere. Anyone interested in chemistry will certainly agree to this, and the scientific committee wants to draw people's attention to it. That is why the motto for this Chemistry Olympiad is:

Chemistry and the quality of life go hand in hand.

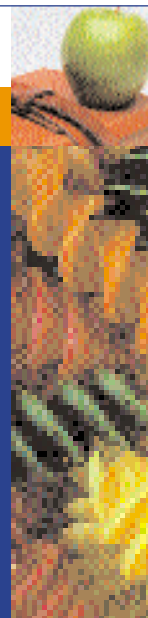
This motto is the central theme running through the Olympiad. It will also return in the assignments, because chemistry and (everyday) life can simply not be separated.

What's on today's menu?

Sunday 07 July 2002

Dinner Buffet at It Wiid

- Argentinian curry soup
- Various types of breads with butter
- Carpaccio of beef with Parmesan cheese
- American potato salad
- Cucumber salad
- Baked beans Argentinian style
- Stir-fry ostrich with okra
- Baked potato
- Vegetarian dish of the day
- Wild rice
- Cannelloni with spinach
- Veal escalopes in tomato sauce
- Apple pie with ice cream



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34th International
CHEMISTRY OLYMPIAD

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