



Preface

The first International Conference on Supramolecular Science & Technology was held in Zakopane (High Tatras), Poland, from 27 September to 3 October 1998, as an initiative of the Global Supramolecular Chemistry Network, organised locally by the Department of Chemistry of Warsaw University, Warsaw University of Technology, and the Polish Supramolecular Chemistry Network Foundation. Almost 190 participants from 26 countries gathered in this picturesque small town in Hotel Kasprowy, at the foothills of the high Tatras mountains. Twenty plenary and invited lectures were presented, 51 short talks, and ca. 130 posters were displayed during this event. This conference, patronised by IUPAC, was highlighted by distinguished speakers: A. Müller, E.C. Constable, C.D. Hall, S. Inoue, L. Lindoy, Y. Aoyama, J.-H. Fuhrhop, M. Hanack, T. W. Bell, U. Lüning, W. Priebe, J. L. Sessler, V.-M. Mikkala, A. Kuznetsov and A. von Zelewsky, to mention a few. The topics of the conference were divided into subdisciplines: advanced materials, supramolecular photochemistry and electrochemistry, synthetic and analytical aspects. Commercial, or practical topics were highlighted by Prof. V.-M. Mikkala from Finland, a distinguished expert on luminescent lanthanide complexes as materials for medical diagnostics, and separations on a technological scale were presented by Dr Krzysztof Krakowiak, of IBC Advanced Technologies (Provo, Utah, USA). The so-called 'Molecular Recognition Technology' allows for the separation of transition metals and platinum metals from very diluted waste waters and the copper refining industry. Also, radioactive waste clean-up is possible using specific ionic carriers immobilised on chromatographic beds designed for this purpose. Due to a remarkable number of short talks parallel sessions were held. Two plenary lectures, one by Achim Müller from Bielefeld University, Germany, on polyoxometalates and one by Alexander von Zelewsky from Friburg University, Switzerland, on chiral transition metal complexes, were superbly highlighted by multimedia presentations. The plenary lectures have been already published in *Pure & Applied Chemistry* (No. 12, 1998). This Special Issue of the *Journal of Inclusion Phenomena & Macrocyclic Chemistry* contains the survey of topics presented during the ICSS&T'98 conference.

Why is supramolecular chemistry so important? Probably there is no need to explain this fact in detail for specialists. It is enough to mention that the explosive growth of supramolecular chemistry is unprecedented in the history of science. It began with the discovery of crown ethers and their metal complexes by Ch. Pedersen in 1967, and immediately developed into an interdisciplinary science comprising selected branches of chemistry, physics and biology, based on non-covalent

interactions. During the evolution of this amazing science, two mainstreams have evolved: biomimetics and advanced materials. The first deals with synthetic mimics of enzymes, channels, membranes, lipid bilayers, DNA-engineered materials, charge-separation systems, water-splitting photocentre mimics, etc. The second, advanced materials, has been designed on polyfunctional supramolecular devices, displaying sophisticated functions, such as energy collectors, carriers, actuators, gates, molecular wires and transistors, sensing devices, rectifiers, magnetic, photochromic, electrochromic materials, luminescent markers, tumour-targeting and NMR-contrast agents, self-assembled monolayers and multilayers, designed colloids, and nanoparticles, to mention a few. It seems that the border between organics and inorganics will gradually disappear, once a multitude of hybrid systems based on inorganic solids and organic molecules has been devised to perform very advanced functions. Initial methodology based on covalent formation of macrocyclic receptor systems has been gradually paralleled by self-assembly and self-organisation of pre-formed molecules – the bricks for forming very complex systems. Actually it seems that self-assembly will play a similar role in a new subdiscipline known as ‘nanochemistry’. In fact, nanostructures are much larger molecular assemblies than supramolecular entities. The ‘Nanoworld’ has developed very rapidly in the past few years. Computer searches back to 1996 revealed more than 20,000 ‘nano’ entries. Nanochemistry will have a profound impact on novel, quantum-sized materials with novel properties different from the bulk materials and molecular dispersion species. Many nanomaterials can be formed via self-organisation.

Is there a justification for the name of ‘Supramolecular Science & Technology’? It seems so. From one side, we are dealing with a multidisciplinary fusion of chemistry, physics and biology. On the other hand, there are many technological achievements: in molecular recognition technologies, sensors, NMR contrast agents (ca. US\$750M in 1997), tumour targeting and therapy agents (estimated US\$2B in 1997), and more recently, highly sophisticated multilayer composite materials for very high density information storage and read-out that is supposed to bring US\$25B in the coming two years (!). Therefore, it is fully justified to invest in supramolecular science and technology which, most probably, will be the leading molecular science of the XXI century.

It is important to mention that our conference was generously supported by strategic sponsors: The Polish State Committee for Scientific Research (KBN), the European Commission (Directorate XII) and the Foundation for German-Polish Co-operation.

It has been decided that the next ICSS&T conferences will be held every two years. The next ICSS&T’2000 will be organised in Leuven, Belgium, in September 2000.

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Guest Editor

Chairman of the ICSS&T’98 and GSCN