

THE 9th ICTA CONGRESS

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The 9th International Congress on Thermal Analysis was held at the Hyatt Regency Hotel in Jerusalem, Israel, between the 21st and 25th of August, 1988. It was organized by the Israel Group for Thermal Analysis (associated with the Israel Chemical Society) in collaboration with the International Confederation for Thermal Analysis (ICTA), under the auspices of the Israel Academy of Sciences and Humanities, the International Union of Pure and Applied Chemistry (IUPAC), the Israel Chemical Society, the National Council for Research and Development (of the Ministry of Science and Development), the Hebrew University of Jerusalem and the Open University of Israel. The congress was attended by about 250 participants, engineers, scientists and technicians from industry, academic institutions and universities, who arrived from different parts of the world. The scientists included physicists, biologists, geologists, mineralogists and of course, chemists.

The program of the congress covered widely divergent disciplines from mineralogy and inorganic chemistry to organic chemistry and polymers and from applied or industrial to theoretical studies. While working on the Program the policy of the Organizing Committee was that except for the time of the Plenary Lectures, there would be five simultaneous sessions of lectures and workshops on different topics so that every one would be able to find the presentation of interest. Furthermore, the Organizing Committee took care that the principal sections would continue from the beginning of the Congress to the end with daily sessions. In this way every one had the feeling that each moment during the Congress was used properly.

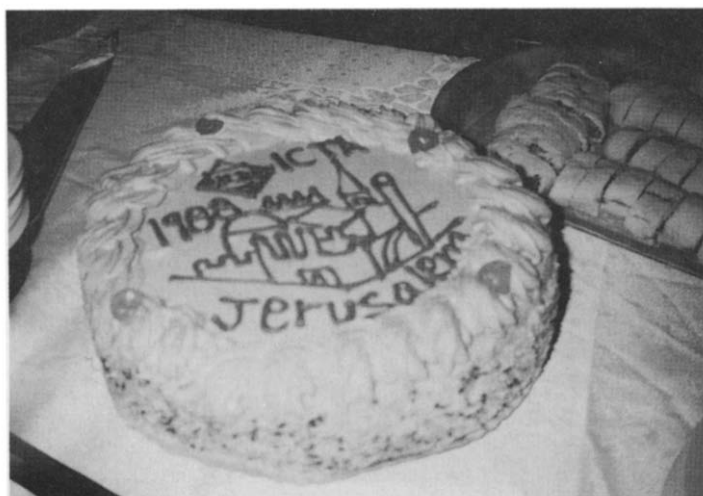
There were the following presentations: ICTA Honorary Membership Lecture, four Award Lectures, eight Plenary Lectures, 14 Invited Sectional Lectures, 104 original scientific oral contributions and

Thermal Analysis Highlights, 9th ICTA, Jerusalem, Israel, 21-25 August 1988.

about 150 original poster contributions. In addition, five workshops were held in collaboration with the Scientific Commission of ICTA to cover several practical and theoretical aspects of thermal analysis. These were:

1. **Chemical and physical properties of superconducting materials characterized by thermal analysis**, led by A. Reller from the University of Zurich, Switzerland;
2. **The study of kinetics by thermal analysis**, led by J.H. Flynn, U.S.A., *Chairman of ICTA Scientific Committee for kinetics*;
3. **The study of organic compounds by thermal analysis**, led by Bina Zvilichovsky from the Israel Fiber Institute, Jerusalem;
4. **Calorimetry and thermal analysis in surface science and catalysis**, led by Bice Fubini from the University of Torino, Italy;
5. **ICTA education committee workshop**, led by Edith E. Turi, U.S.A. *Chairman of ICTA Scientific Committee for Education*.

During the Opening Ceremony ICTA conferred the title of Honorary Member on Dr. Robert C. Mackenzie of Aberdeen, Scotland, in recognition of long and outstanding service to the Confederation. In his Lecture ("Lumitron" - ICTA Honorary Membership Lecture) Dr. Mackenzie discussed early thermometry and differential thermometry describing the development of thermometers from thermoscopes in the 17th century.



9th ICTA Congress Cake (Photographer Edith E. Turi)

Prof. David Dollimore of Toledo, Ohio, USA was the recipient of the "DuPont"-ICTA Award. In his Award Lecture he discussed the various effects of temperature dependent factors upon the mechanical and surface properties of solids.

ICTA Young Scientist's Award was given to Mrs. Judith Schlichter Aronhime of Jerusalem, Israel. Her Award Lecture was presented during the Workshop on organic compounds and was dedicated to the applications of DSC in the study of polymorphic transformations of triglycerides. The presence of surfactants affects these transformations which are dependent on their hydrophilic groups.

The Award of the Royal Society of Chemistry, Thermal Methods Group was given to Dr. M. Reading of Slough, England. His Award Lecture was dedicated to the kinetics of heterogeneous solid state decomposition reactions.

The Bodenheimer Award of the Israel Group for Thermal Analysis was given to Dr. Jaroslav Sestak of Prague, Czechoslovakia. The Award Lecture by Dr. Sestak was dedicated to nontraditional and traditional methods of thermal treatments and analysis. Dr. Wolf Bodenheimer (1905-1975) was the first Israeli scientist to apply modern thermal analysis methods. The Award was funded by the family, friends and students of Dr. Bodenheimer and by the Israel Clay Society, of which Dr. Bodenheimer was the first president.

The following Plenary Lectures were presented:



Opening Ceremony (Photographer Leslie Weisenbaum)

1. **Polyesters: phase behavior in blends, liquid crystals and composites**, by R.S. Porter, U.S.A.;
2. **The detection of conformational disorder by thermal analysis**, by B. Wunderlich, U.S.A. (*"Ankor" Plenary Lecture*);
3. **Thermal analysis of polymers**, by T.R. Manley, U.K. (*Royal Society Sponsored Lecture*);
4. **Synthesis and real structures of inorganic materials**, by H.R. Oswald, Switzerland (*"Landseas" Plenary Lecture*);
5. **Synthesis and thermal properties of superconducting mixed copper oxides**, by A. Reller, Switzerland;
6. **The investigation of ancient oriental artifacts by thermal analysis**, by H.G. Wiedemann, Switzerland (*"Mettler" Plenary Lecture*);
7. **The light emission of thermally stimulated processes: Emission thermophotometry**, by W.W. Wendlandt, U.S.A. (*"Landseas" Plenary Lecture*);
8. **The future of thermal analysis**, by E.E. Turi, U.S.A. (*Congress Closing Lecture*).

As in previous ICTA Congresses, there were many presentations on physical chemistry of solids at the 9th ICTA Congress. In addition to the three of the Award Lectures on this subject, the following invited lectures were presented:



S. Yariv presenting the ICTA Young Scientist Award to Mrs. J.S. Aronhime (Photographer Leslie Weisenbaum)

1. Kinetics of decomposition of the solid state, is there a dichotomy? by P.D. Garn, U.S.A.;

2. Structure and reactivity of solids, by Z.G. Szabo, Hungary.

One of the major sections was on the thermal behaviour of geological materials, mineralogical analysis, clay chemistry, geopolymers, coal, oil shales and fuels. Minerals discussed in this session were pyrite, quartz, zircon, phosphates, siderite, calcite, dolomite, ankerite, kaolinite, smectites, manganite, halloysite and feldspar. The following Invited Review Lectures were given in this section:

1. Earth sciences applications of evolved gas analysis, by D.J. Morgan, U.K.;

2. Thermal analysis of geopolymers: an overview, by Z. Aizenshtat, Israel.

Another major section was on polymers. The following subjects were treated in this section, thermoplastic polymers, Saran degradation, thermal aging effects of polypropylene, thermal shrinkage stress relaxation, poly(dihexyl itaconate), epoxy film adhesive, epoxy powder coatings, curing and decomposition of methyl silicon resin, glass transition, polymer blends, lifetime prediction for polymers and waterproof film forming products. In



Dr. J. Sestak (left) receiving the Bodenheimer Award From Dr. M. Ben-Yair, Chairman of the Israel Group for Thermal Analysis, with Prof. M. Steinberg, Chairman of 9 ICTA Organizing Committee on right (Photographer L. Weisenbaum).

addition to the three Plenary Lectures on polymers, two invited review lectures were given in this section:

1. **Modeling and processes in calorimetry and application**, by J.M. Vergnaud, France. The reactions which were discussed were of high and low enthalpy of cure with epoxy resin and rubber samples. These models take into account not only the heat evolved from the reactions but also the heat transferred through the sample, holder and interface;
2. **Thermally stimulated processes in organic polymers**, by R.J. Fleming, Australia (*Australian Friends of the Hebrew University Lecture*).

Polymers were also dealt with in the workshops on kinetics, organic materials and education.

Other sections of organic chemistry were dedicated to emulsifiers, biological, medical and pharmacological materials, organometallic and coordination compounds. Lectures were given on the thermal properties of these compounds, and on polymorphic transformations of various materials under the influence of emulsifiers.

Several sections were dedicated to inorganic chemistry, including ceramic materials, superconductors and metallurgy. Materials discussed were hausmanite, chromium sulfides, black powder, magnesium hydroxide, lanthanide and actinide tetrafluorides and



Informal Party. Friends celebrate the bestowal of ICTA Honorary Membership to Dr. Robert C. Mackenzie. l to r Prof. Z. Kallai, Prof. L. Heller-Kallai, Dr. R.C. Mackenzie, Mrs and Prof. H. Minato (Photographer Leslie Weisenbaum).

high temperature superconductors. In addition to the thermal behaviour and synthesis of the above mentioned materials, phase investigations of the system $\text{Na}_3\text{AlF}_6\text{-NaCl}$ were also described. A new approach to the relations between the structure and thermal reactions of solids was presented by L. Stoch, of Poland. Another topic which should be mentioned here is the new approach to kinetic studies of nucleation and growth processes of T. Ozawa, from Japan. In addition to the three plenary lectures on inorganic topics the following Invited Sectional Lectures were presented:

1. **Characterization of inorganic materials by means of diffusion structural analysis**, by V. Balek, Czechoslovakia, (*"Israel Chemicals, Ltd."* invited lecture);
2. **Luminescence of chromium and manganese in glasses, glass-ceramics and crystals**, by R. Reisfeld, Israel;
3. **Application of thermal analysis to kinetic study of superconducting oxide formation**, by T. Ozawa, Japan;
4. **Application of thermal analysis to the study of crystal growth, defect structure and thermal expansion of LiNbO_3** , by P.K. Gallagher, U.S.A.;
5. **Application of computer controlled thermoanalytical techniques in material research on advanced ceramic materials**, by O.T. Sorensen, Denmark.



9th ICTA Congress visits the Old City of Jerusalem.
King David's Tomb (Photographer Leslie Weisenbaum).

Another long section dealt with the development of methods and instrumentation. Presentations were given on water treatment, combustion of industrial waste materials, desulfurization of combustion gases, safety screening of chemicals and the improvements of some DSC and TG systems for non-conventional applications as well as optical differential thermal analysis. The following Invited Sectional Lecture was presented:

1. **Interplay of calorimetry and thermal analysis**, by H. Suga, Japan.

There was also a section dedicated to surface chemistry, adsorption and desorption, catalysis, and zeolites. In this section there were papers on the characterization of zeolites or other catalysts and porous materials by thermal methods, on adsorption - desorption studies and on the study of catalyzed reactions by thermal analysis. The following Sectional Invited Lectures were presented:

1. **Adsorption calorimetry in surface chemistry**, by B. Fubini, Italy;
2. **The role of thermal analysis and calorimetry in the study of porous or divided materials**, by J. Rouquerol, France.

Sunday evening was a "Welcome Reception" where participants enjoyed Israeli wines. Monday evening was dedicated to the chemical industry of Israel. A symposium was organized by scientists from



8th ICTA Congress visits the Old City of Jerusalem. The Weill Museum in the Jewish Quarter - Excavations from the period of 2nd Temple (Photographer L. Weisenbaum)

the "Israel Chemicals, Ltd." and the Ministry of Industry and Commerce. After the symposium participants enjoyed folk songs and dances performed by the Hebrew University Students group.

On Tuesday night the Congress visited the Israel Museum where participants were able to see Jewish art from all periods, archeological artefacts of the Middle East from the period of the Bible and from earlier times, and the Dead Sea Scrolls. On Wednesday afternoon the Congress visited the Old City of Jerusalem. The excursion started at Mount Zion, where participants visited the Tomb of King David, the Room of the Last Supper and the Dormition Church. Walking through Zion Gate, participants visited the excavations of the Weill Museum in the Jewish quarter, viewing remnants from the period of the Second Temple. From there participants went on to the Christian quarter and visited the Holy Sepulchre. After this obligatory visit in the church, participants walked along the Via Dolorosa. This excursion ended at the Western Wall.

Prof. Menachem Steinberg from the Hebrew University of Jerusalem, served as the Chairman of the Organizing Committee and Dr. Shlomo Shoval from the Israel Open University in Tel Aviv served as the Secretary of the Organizing Committee.



Congress Banquet. l to r Prof. I. Pelly (*Chairman of 9th ICTA Congress Scientific Committee*), Prof. D. Dollimore (*1988 DuPont-ICTA Award Winner*) Mrs. Dollimore, Prof. S.St.J. Warne (*ICTA President*), Mrs. H. Steinberg, Prof. M. Steinberg (*Congress Chairman*), Mrs. Warne, Prof. S. Yariv (*ICTA Secretary*) Mrs. S. Yariv, Prof. T. Ozawa (*ICTA Vice-President*) Mrs. I. Nesh-Shoval, Dr. S. Shoval (*Secretary of the 9th ICTA Organizing Committee*) (Photographer Leslie Weisenbaum)

The Pre-Congress Proceedings (edited by S. Yariv), with 1350 pages and more than 180 full short papers, was published as part of *Thermochimica Acta* (Volumes 133-135). A special issue of *Pure and Applied Chemistry* (August, 1989, edited by M. Steinberg and S. Yariv) is dedicated to the 9th ICTA Congress and includes five full length manuscripts of plenary lectures.

The present volume (the Post-Congress Proceedings) contains comprehensive reports on the five workshops and on most of the sessions which were held during the congress, pointing out the novelties and recent achievements in thermal analysis. It also contains several short review articles on several of the topics which were treated in the 9th Congress, covering the literature published mainly after 1985 (the year of the 8th ICTA Congress). I am grateful to all those who prepared the reports and the review articles. Original papers of contributions presented in the congress either orally or by poster and which had arrived too late to be included in the Pre-Congress Proceedings, are also included in this volume.

In addition to the official congress program, small groups were meeting in the the beautiful lobbies and gardens of the Hyatt Hotel, and in an informal way, discussing different scientific problems. In one of the corners I saw Prof. Stoch of Poland surrounded by a group of scientists discussing different problems



ICTA President S.St.J. Warne and ICTA Secretary S. Yariv at Business Meeting, 25 August, 1988 (Photographer Leslie Weisenbaum)

in thermochemistry of solids. In another corner I saw Prof. Mendelovici of Venezuela talking with some participants on problems associated with thermal syntheses of inorganic materials. One day after the workshop on kinetics I saw Prof. Segal of Romania surrounded by some of the participants of that workshop, continuing discussions which had started already a day earlier. In another place I enjoyed listening to Mr. Haines of the U.K. discussing with his colleagues some of the papers on polymers which had been presented in the congress. Prof. Sato of Japan was discussing with friends some of thermal properties of the hydroxides and oxides of lanthanides and actinides. There were many other un-official discussions and whenever I encountered such meetings, I invited one of the participants to prepare a special report for our Post-Congress Proceedings. Some of our colleagues were kind enough to prepare these Reports and they are included in this volume.

As in the Pre-Congress Proceedings, the contributions to the Post Congress Proceedings were submitted as camera ready copy. The papers were reviewed by specialists. I am grateful to all the referees who did their reviewing with great dedication. I am also grateful to Dr. Harold Cross of Jerusalem, who helped me in the editing of this volume.

The 10th ICTA Congress will take place in 1992 in Hatfield Polytechnic, Hatfield, England.



Informal reception for ICTA Councillors held at the Yariv home on August 19, 1988. 1 to r (top) Prof. S.St.J. Warne (President), Dr. D. Morgan (Chairman of ICTA Awards Committee), Prof. M. Steinberg (Chairman of 9th ICTA Organizing Committee), (bottom) Mrs. Ilana Nesh-Shoval, Prof. A. Langier-Kuźniarowa (Councillor at-large), and Dr. Shlomo Shoval (Secretary of the 9th ICTA Organizing Committee). (Photographer Edith E. Turi, Chairman of ICTA Education Committee)



ICTA Council Meeting took place on the 19, 21 and 25th of August. Council in session. Top: l to r (facing camera) S.St.J. Warne, S. Yariv (partly hidden), A. Langier-Kuźniarowa, J. Rouquerol, E. Charsley, W. Eysel (partly hidden), Y. Kirsh, T. Ozawa, G. Hakvoort, D. Morgan, J. Hill, M.E. Brown, (backs) P.K. Gallagher, J. Flynn, M. Steinberg, Yehuda Yariv (Technical Assistant) and V. Balek. Bottom: r to l S.St.J. Warne (President), P.K. Gallagher (Treasurer), J. Flynn, M. Steinberg, Yehuda Yariv (Technical Assistant). (Photographer Leslie Weisenbaum)