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# ZEOLITE SCIENCE 1994: RECENT PROGRESS AND DISCUSSIONS

Supplementary Materials to the 10th International Zeolite Conference,  
Garmisch-Partenkirchen, Germany, July 17–22, 1994

Editors

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## PREFACE

The 10th International Zeolite Conference was held from July 17 to 22, 1994 at Garmisch-Partenkirchen, Germany. The attendance was unexpectedly high and very encouraging with respect to the future perspective of the scientific field to which the conference was devoted. About 950 active and 50 accompanying attendees were welcomed by the Organising Committee. The Proceedings of the Conference were handed out at the beginning of the Conference. As far as one can judge from the immediate response to the presentations as well as from that to the Proceedings, the conference seemed to be a remarkable scientific success. We are now able to issue a supplementary volume which comprises in the first chapter various items, viz. (i) a list of the sponsors to whom the organisers are particularly grateful because of their significant support; (ii) the welcome address; the phrasings of the BRECK AWARD and the IZA AWARD which was first awarded at the 10th International Zeolite Conference; (iii) the address on the occasion of the appointment of the first Honorary President of the International Zeolite Association (IZA), Professor R. M. Barrer, and, finally, the marvellous after dinner speech by Professor Cyril O'Connor from the University of Cape Town.

The larger part of the supplementary volume presents the full texts of the Recent Research Reports, which were presented as posters, and the Discussions of all the lectures and posters which were submitted to the editors.

One full paper is also included, viz. the paper "Alkylation of aniline with methanol on Beta and EMT zeolites exchanged with alkaline cations" by P. R. Hari Prasad Rao, Pascale Massiani and Denise Barthomeuf because, due to a regrettable error, one page was missing in the version published in the Proceedings.

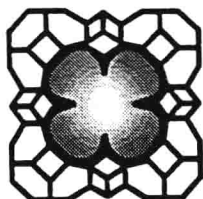
Finally, the supplementary volume also contains a complete list of the participants.

The editors sincerely hope that not only the attendees of the 10th IZC, but also any colleagues interested in the field will enjoy reading the book and draw some benefit from it.

Berlin and Stuttgart, May 1995

Hellmut G. Karge

Jens Weitkamp



# 10th International Zeolite Conference July 17 - 22, 1994

## List of Sponsors

The Organizing Committee gratefully acknowledges support by the following institutions and companies:

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- 2 Max-Planck-Gesellschaft zur Förderung der Wissenschaften e. V.,  
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# List of Sponsors

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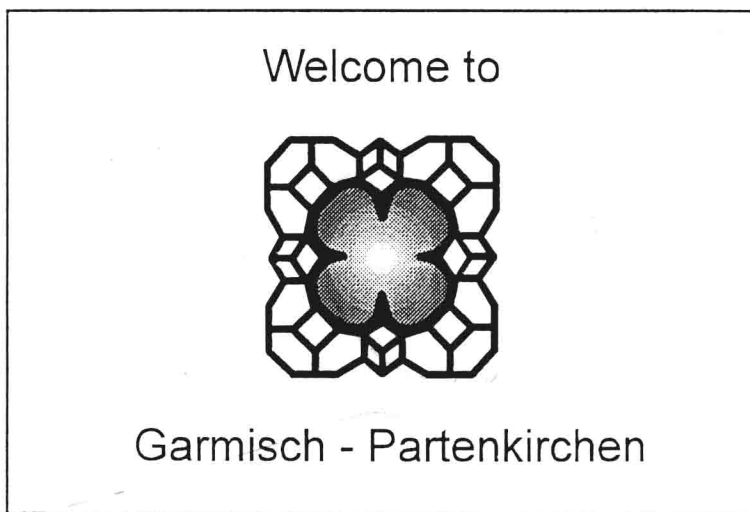
- 23    **Hüls AG, Marl, Germany**
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**Welcome Address by Jens Weitkamp,  
Chairman of the Organizing Committee**

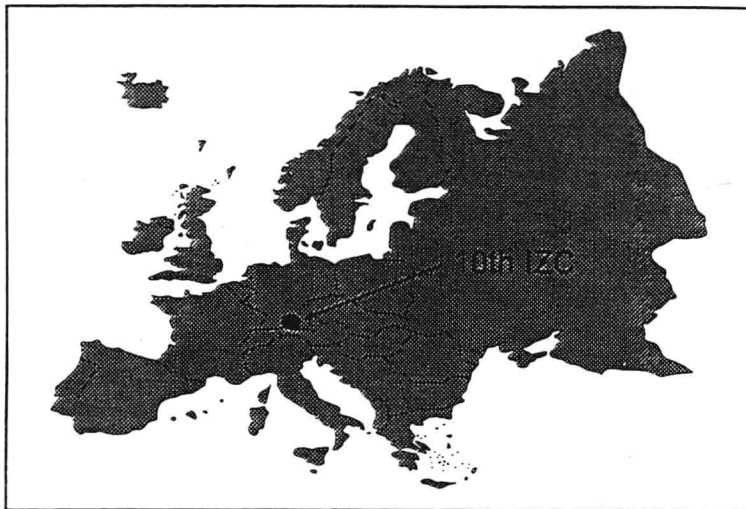
(held on July 18, 1994)

Dear Participants, Distinguished Guests, Friends,

Welcome to the 10th International Zeolite Conference! This is the day we have been looking forward to since the decision of the Council of the International Zeolite Association in early 1991, to have the 10th International Zeolite Conference held in this country, in the beautiful City of Garmisch-Partenkirchen. Our experience with the local authorities and people were so good that we felt a strong temptation to apply again for the 12th International Zeolite Conference, again with Garmisch-Partenkirchen as the venue.



In fact, as many of you will have recognized, this is a truly European rather than a German congress. Not only is our hosting city located right in the heart of Europe, within walking



distance of Austria and within hiking distance of Italy; but the organization, which extended over years, was done by a team of European experts. Our deeply felt thanks go to a number of colleagues who - upon our request - spontaneously agreed to shoulder large parts of the burden of the organizational work:

- *Dr. Koos Jansen* from Delft University of Technology, The Netherlands, and *Dr. Michael Stöcker* from SINTEF in Oslo, Norway, organized the Summer School on Zeolites held last Thursday, Friday and Saturday in Wildbad Kreuth, some 60 km away from here, and as we understand from the participants, they did an excellent job.
- *Professor Johannes Lercher*, who recently moved from Vienna University of Technology in Austria to Twente University at Enschede, The Netherlands, took over the responsibility for the program offered to accompanying persons.
- And *Professor Carmine Colella* with his team from the University of Naples, Italy, organized the Post-Conference Field Trip to the Latium and Umbria Regions in Central Italy.

Ladies and gentlemen, organizing large international congresses has lately become more difficult, at least in Europe, since both governmental institutions and industrial companies are getting increasingly reluctant to sponsor the flood of scientific conferences. The Organizing Committee appreciates the generous support by



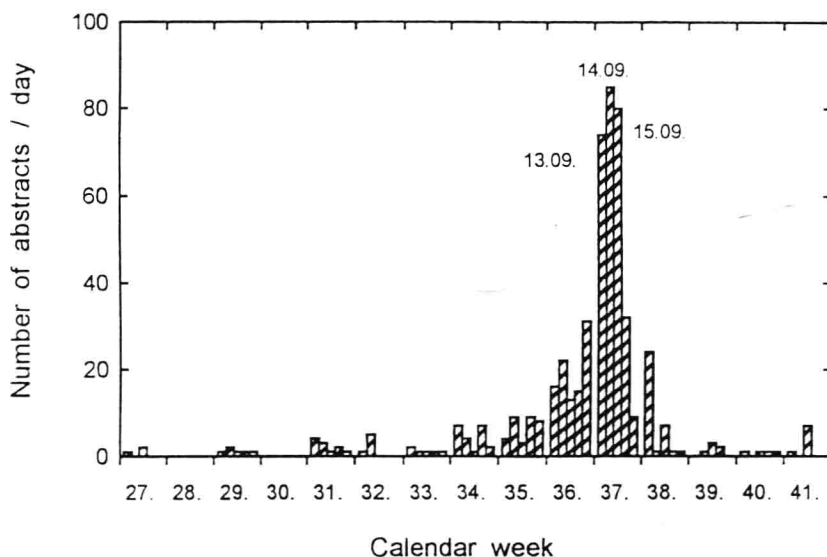
- the Max Planck Society,
- the German Science Foundation (Deutsche Forschungsgemeinschaft) and
- the State Government of Bavaria.

In addition, an impressive number of industrial companies from many countries were willing to support the 10th IZC, and we express our gratitude to these industrial sponsors whose names are given on posters displayed at various locations in this building and on a list handed out to every participant during registration.

This Conference was organized in close contact with the International Zeolite Association, and IZA appointed *Jan van Hooff* as official IZA observer. We enjoyed very much the cooperation with Jan, and we thank him for his active support of this Conference.

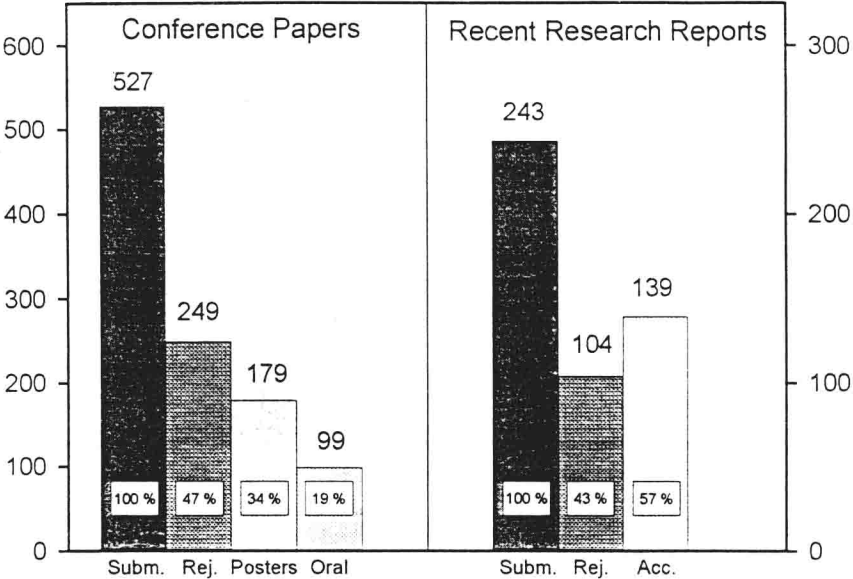
Let me now briefly address the scientific program and the procedures of paper selection. The Organizing Committee is grateful to a number of renowned experts from the international zeolite community who agreed to present plenary lectures on key issues of zeolite science and technology: Synthesis and structure analysis are becoming increasingly important and will be dealt with by *Peter Jacobs* and *Lynne McCusker*, respectively. The progress in diffusion inside microporous solids will be reviewed by *Lovat Rees*. And various aspects of the use of zeolites as catalysts ranging from ab-initio calculations to industrial and environmental catalysis will be covered by *Werner Haag*, *Joachim Sauer*, *Joop Naber* and *Mazakazu Iwamoto*.

Ladies and gentlemen, I confess that there was much concern within the Organizing Committee about the repercussions of the IZA's decision to shorten the intervals between successive Conferences from three to two years. We had a number of worst case scenarios in our drawers, but fortunately, when the deadline for submission of papers approached in the 37th week of 1993, we could abandon all these scenarios. Not only was the response to our call for papers overwhelming, but - to our surprise - the authors were willing to meet the deadline.



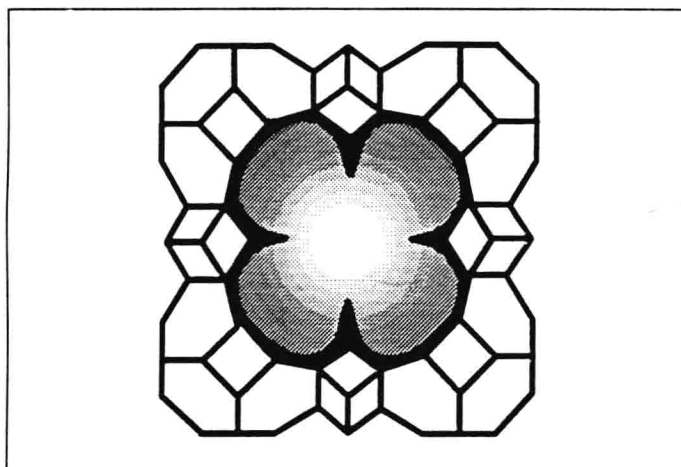
Still more importantly, the originality and quality of many abstracts were outstanding, and our Sub-Committee for Paper Selection chaired by *Dr. Ernst Ingo Leupold* and *Dr. Lothar Puppe* had a very difficult task. The Organizing Committee is deeply indebted to the European experts who spent a huge amount of their precious time on ranking and selecting the submitted abstracts:

E.I. Leupold,	Hoechst AG, Frankfurt, Germany
L. Puppe,	Bayer AG, Leverkusen, Germany
C. Baerlocher,	ETH Zurich, Switzerland
G. Bellussi,	Eniricerche S.p.A., San Donato, Italy
E. Gallei,	BASF AG, Ludwigshafen, Germany
H. Kessler,	E.N.S.C.M., Mulhouse, France
P. Kleinschmit,	Degussa AG, Hanau, Germany
P. Krings,	Henkel KGaA, Düsseldorf, Germany
W. Mortier,	Exxon Chemical Int., Machelen, Belgium
M. Stöcker,	SINTEF, Oslo, Norway
K.K. Unger,	University of Mainz, Germany



Our thanks furthermore go to all those who submitted a contribution. In fact, more than 500 Conference papers were submitted out of which we accepted ca. 100 for oral and ca. 180 for poster presentation. Let me emphasize here again that no quality difference exists between papers presented orally and those displayed as posters, and you will detect no difference at all in the Conference Proceedings you received here in Garmisch-Partenkirchen. In our opinion Elsevier Science Publishers did an excellent job, and we convey our thanks to Elsevier for their efficiency. Another flood of abstracts submitted for presentation as posters in the Recent Research Report Session this afternoon, reached us in March, April and May of this year, and we were able to accept slightly more than 50 % of these.

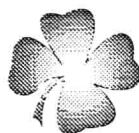
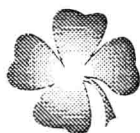
Ladies and gentlemen, one of the very early and most important duties of an Organizing Committee is the selection of a good logo. We were, in fact, extremely lucky in this respect: An exciting new structure was discovered in Europe by our colleagues *Lynne McCusker*, *Christian Baerlocher* and *Henri Kessler* and their coworkers. Our Organizing Committee is grateful to these outstanding scientists not only for having made the discovery, but also for having made it at the right time for our purposes and for giving us every support, together with *Walter Meier*, in translating the structure into a suitable logo.



As we believe, it teaches and reminds us of a number of different things, namely

- (i) how aesthetic zeolitic structures are,
- (ii) that super- or ultra-large pore zeolites are certainly among the thrust areas of our science,
- (iii) that, in the heart of our beloved science, considerable darkness continues to exist and many questions are still obscure.
- (iv) Finally, it will accompany us during the whole Conference week with its four-leafed clover.

## 10th International Zeolite Conference Garmisch - Partenkirchen, 1994



Enjoy yourselves !

Jens Weitkamp

Harry Pfeifer

Hellmut G. Karge

Wolfgang Hölderich

The Organizing Committee sincerely hopes that the four-leafed clover will contribute to make this Conference efficient, fruitful and successful and wishes you a week full of luck and happiness.

I declare the 10th International Zeolite Conference opened.

Jens Weitkamp



10th IZC Garmisch - Partenkirchen, July 17 - 22, 1994

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## Breck Award 1994

In 1992

C.T. Kresge

M.E Leonowicz

W.J. Roth

J.C. Vartuli and

J.S. Beck

of the Mobil Research and Development Corporation reported a significant breakthrough in the synthesis of porous materials. The Mobil group successfully prepared the first ordered mesoporous silicate and aluminosilicate materials containing pores in the range of 16 to 100 Å.

This startling discovery was accomplished by using liquid crystal "templates". That is surfactant molecules that can self-assemble into ordered structures which interact with the inorganic species to form the final composite material.

The Mobil work is the first to use organized organic species as "templates" rather than single molecules as is common in molecular sieve synthesis.

The impact of the discovery of the Mobil is large since it:

- i) created a new type of material
- ii) developed a new synthetic strategy and
- iii) opened new areas of technology for catalysis, separation and guest-host chemistry.

The novelty and generality of these concepts provide research directions for years to come.

Thus the efforts of the Mobil group deserve the 1994 Breck Award.

## IZA AWARD 1994

A decision was made by the IZA Council to create an IZA Award that would be given to an individual who would serve as an ambassador for the IZA to the world zeolite community. This person will be responsible for educating other scientists about zeolite molecular sieves, and a grant will be given to assist them in this task. The mechanism for arranging visits by the Recipient will be handled by a representative of the IZA Council. The individual chosen for this award is being honored by the IZA for long term commitments and contributions to Zeolite Science.

At this 10th IZC, the first IZA Award will be presented to an individual, whose name is almost synonymous with zeolites and molecular sieves:

### Edith M. Flanigen

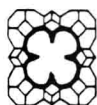
Edith's Synthesis Group has been called "The Discovery Group". They were awarded the First Don Breck Award given at the 6th IZC for the discovery of the  $\text{AlPO}_4$  Molecular Sieve family of material and have gone on beyond that to SAPOs, MeAPOs, MeAPSOs, Sulfide materials and much, much more. She has enthusiastically led her group at Union Carbide and UOP, and we feel that she will be the ideal zeolite ambassador for the IZA to the world.

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Hellmut G. Karge  
IZA President

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Roland von Ballmoos  
IZA Secretary



10th IZC Garmisch - Partenkirchen, July 17 - 22, 1994

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## Honorary President

The IZA Council honours

*Professor Richard Barrer*

for his outstanding contributions to zeolite science by awarding him  
the title of

**Honorary President of the IZA.**

With great appreciation.

---

Hellmut G. Karge  
IZA President

---

Roland von Ballmoos  
IZA Secretary



**AFTER-DINNER SPEECH PRESENTED AT THE BANQUET OF  
THE 10TH INTERNATIONAL ZEOLITE CONFERENCE,  
GARMISCH-PARTENKIRCHEN, GERMANY, JULY 1994.**

by Cyril T. O'Connor

Ladies and Gentlemen

I hope that you will sympathise with me being requested to deliver an after dinner speech at the end of a long hard-working conference week. When Hellmut asked me to fulfil this duty he suggested that something light hearted would be appropriate. I suppose that after he and the Organising Committee had recovered from the fits of laughter they must have had when they read some of the hilarious contents of the abstracts I submitted they must have immediately concluded that here was an excellent candidate for an equally hilarious after dinner speech. Anyway, I suppose that one of the advantages of this conference slot compared the poor people who landed the early afternoon siesta or graveyard sessions is that my paper hasn't had to be refereed and there is no question time at the end.

In preparing a few words for this evening it soon became apparent to me that one difficulty in trying to be humorous in front of such an international audience is that humour does not easily cross geographical boundaries. Each country does have their country bumpkin - in South Africa we call him van der Merwe, in Ireland he's called Paddy and so on. One species of the human race, however, which does lend itself at all times to being laughed at and about are politicians. Before I relate the following story let me remind you that many of you who know me well are very much aware of the fact that I am a great lover of Germany, German life and German hospitality. One distinctive feature of German hospitality is that it is most usually accompanied with excellent wine or beer. A visit to Germany is unfulfilled if one hasn't enjoyed the excellent white wines in particular or the wide variety of beer for which Germany is so famous. One of the most famous of these is, of course, Pils which originates from Czechoslovakia. Any newcomer to the wonders of a Pils soon finds out that it takes a long time to pour a pils. My story revolves around an invitation extended some years ago by a famous Indian Maharajah to President Ronald Reagan, Mrs Margaret Thatcher and Chancellor Helmut Kohl. It was an interesting palace except that the swimming pool was permanently empty. Upon being quizzed on this matter the Maharaja informed his illustrious guests that the distinguishing feature of the pool was that as one stood at the edge ready to dive in one could call out the name of any liquid which one fancied and the pool would immediately be filled with this. Margaret Thatcher, being the lady, was first to take the plunge and just before she jumped in she called out "Guinness Stout". Immediately the pool was filled with marvellous stout even including the froth and upon leaving the pool it promptly drained. President Reagan repeated the trick except that he preferred Jack Daniels. Chancellor Kohl was last in and he fancied a