

**CIRCULATING  
FLUIDIZED  
BED TECHNOLOGY IV**



**Hidden Valley Conference Center  
and Mountain Resort  
August 1-5, 1993.**

**Edited by  
Amos A. Avidan**

## Preface

The Fourth International Conference on Circulating Fluid Beds, **CFB-4**, was held at the Hidden Valley Conference Center and Mountain Resort, near Somerset, Pennsylvania, U. S. A, August 1 - 5, 1993. The conference was attended by over 240 delegates, from many Academic and Industrial organization throughout the world. As in previous CFB conferences, there was an excellent balance between Industrial and Academic participation, which makes the CFB conferences a unique forum for facilitating communications between the theoreticians and the practitioners in the field. The informal setting of the conference also helped create many opportunities for exchange of views and ideas.

The conference focused on various aspects of the fundamentals and the applications of circulating fluid beds. As in the past, there were many contributions in the area of fluid bed hydrodynamics, which continues to fascinate and challenge researchers. Several sessions were devoted to CFB combustion, which has developed in the last decade into a major application of fluid bed technology. Other sessions were devoted to CFB components, heat and mass transfer, mixing and emissions. Two areas were highlighted to a greater extent than in previous forums: The first is CFB reactors and scaleup, and particularly the application of fluid catalytic cracking, or FCC. Even though FCC is one of the oldest and most important application of Fluidization, it is far from being fully understood, and the topic is not always covered properly at Fluidization meetings. The second new area of emphasis is CFB Hydrodynamic modeling using more rigorous approaches. There has been considerable progress in this area, and it was summarized well in session 5A.

The format of the conference (see Conference Program) included 4 Plenary lectures, 15 parallel Technical Sessions, each with about 8 technical papers, 8 workshops, and 2 poster sessions. This format allowed for about 20 minutes per paper, including presentation and discussion. Most of the papers were published as six-page extended abstracts in a Preprint volume, which was available on-site. Following the conference, the papers were reviewed and revised, and 99 papers from the regular sessions were selected for this Proceedings volume in an 8-page format. This volume also contains three of the Plenary lectures, three of the poster session papers, and reports on two of the workshops.

*Many people and organizations helped make CFB-4 a success. The American Institute of Chemical Engineers has hosted the conference and put considerable effort into reaching a wide audience, many of whom attended a CFB conference for the first time. I want to particularly acknowledge the help of Peter Knox, Marie Stewart, and Denise DeLuca. Denise was also responsible for the high quality of the Preprint volume, which was available on site, and was very helpful to all of us in following the technical presentations and participating in the discussions. The National Science Foundation has helped many researchers attend the conference, as did the following Sponsoring Organizations: Emtrol Corporation, Lurgi Lentjes Babcock Energietechnik*

GmbH, and the Babcock and Wilcox Company; and the following Supporting Organizations: ABB Carbon AB, Coastal Catalyst Technology, Inc., and The M. W. Kellogg Company. Special thanks to Ms. Betsy Mettee for arranging the Grace Davison FCC exhibit.

*I want to express my gratitude to Ted Knowlton, of the Institute of Gas Technology and Particulate Solids Research, Inc. and W.-C. Yang, of Westinghouse for helping with many of the aspects of organizing the conference. Many thanks to the members of the International Advisory Board, and to Prabir Basu of the Secretariat of the International Conference on Circulating Fluidized Beds. Special thanks to June Cavallo, of Mobil, whose help was crucial to the success of the conference.*

*The most important aspect of CFB-4 is its technical quality and lasting contribution to the field. No one is more responsible for this than the Session Chairmen (see conference program), who made sure that each session represented the state of the art in that specific area, and to the referees who helped with the peer review of the papers in this volume. I found the task of organizing an international conference to be much more involved than I thought when I accepted the assignment, and I would not have been able to complete it without the extensive help I received for all the people mentioned here, and many others. I am grateful to all of you. I have received many positive comments from many of the delegates, who have enjoyed the conference, and found it useful. I certainly enjoyed meeting new and old friends, and participating in many stimulating discussions.*

Three quarters of the 63 people (half from Academia and half from Industry) who returned the on-site conference survey rated the conference as Good or Excellent. Most found the posters, and especially the workshops to be useful, and most found the split between hydrodynamic fundamentals, heat transfer, design, and applications to be just right. Most of the respondents also supported holding the CFB conference as a separate venue, as in the past. CFB-5 will be held in Beijing, China, and the tentative date is May, 1996.

March, 1994

Amos A. Avidan  
CFB-4 Conference Chairman