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Circulating Fluidized Bed Technology VII



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PREFACE

This volume publishes the papers presented at the 7th International Conference on Circulating Fluidized Beds held at Niagara Falls, Ontario, Canada from May 5-8, 2001. Authors were invited to submit full manuscripts on the basis of abstracts which had been considered by the Canadian advisory committee. Once received, the papers themselves were carefully reviewed by a panel of qualified arms-length experts, whose names are listed in this volume. We are very grateful to these reviewers for their assistance. In almost all cases the papers which appear in this volume have benefitted substantially from the review process. Four authors were also invited to prepare plenary "overview" papers to cover topical issues that had not been addressed sufficiently at previous conferences. These four papers were also subjected to the review process, and they appear at the beginning of this volume.

Publication of the book coincides with the conference itself, enhancing the transfer of information and the archival value of the occasion. Circulating Fluidized Bed Technology VII takes its place with the previous six volumes in the series:

- Vol. 1, ed. P. Basu, Pergamon, Toronto, 1986 (442 pages). Conference in Halifax, Canada.
- Vol. 2, ed. P. Basu and J.F. Large, Pergamon, Oxford, 1988 (572 pages). Conference in Compiègne, France.
- Vol. 3, ed. P. Basu, M. Horio and M. Hasatani, Pergamon, Oxford, 1991 (650 pages). Conference in Nagoya, Japan.
- Vol. 4, ed. A.A. Avidan, A.I.Ch.E., New York, 1994 (704 pages). Conference in Hidden Valley, Pennsylvania, U.S.A.
- Vol. 5, ed. M. Kwauk and J. Li, Science Press, Beijing, 1997 (657 pages). Conference in Beijing, China.
- Vol. 6, ed. J. Werther, DECHEMA, Frankfurt, 1999 (1020 pages). Conference in Würzburg, Germany.

Each of these seven volumes represents a major source of information on circulating fluidized beds and related topics. The series brings together all of the major CFB research groups from around the world. Like its six predecessors, this volume focuses on both applications and fundamentals. Twenty-four countries on five continents are represented in the authorship. With the passage of time, many of the applications of circulating fluidized beds have matured. Fluid catalytic cracking of hydrocarbons and CFB combustion of coal and a host of other carbonaceous materials remain the major applications, while other applications, such as calcination, gasification, pyrolysis, roasting of ores and desulphurization, are also under active

development. This volume reflects increasing attention being paid to the application of computational fluid dynamics to circulating fluidized beds. Extensions of the technology to downflow reactors – “downers” – as well as to liquid- and gas-liquid-supported systems also continue to gain ground. Here we present a number of papers in each of these areas, as well as on topics such as hydrodynamics, heat transfer and combustion that have been featured also in previous volumes.

Circulating fluidized beds are studied both because they are of practical importance for industrial applications and because they are inherently challenging and interesting. Particles in risers and downers behave in some ways like molecules of gases, but they are subject to a wide range of forces, e.g. due to gravity, drag from the conveying fluid, and electrostatic charges. The particles themselves vary in shape, size and surface characteristics, while the equipment can be of many different sizes and geometries. Turbulence and collisions among particles, as well as between particles and the containing vessel, add to the complexity. Assuring appropriate conversion or yields, maintaining safety, providing sufficient heat transfer, minimizing emissions of particulates and gaseous pollutants, and scaling up to full industrial size all provide significant technical challenges. This volume outlines experiences of various international groups drawn from industry, universities and governments in addressing these and similar issues.

The editors express their gratitude to a number of people who have been helpful in organizing the conference and in producing this volume. In particular, we acknowledge the assistance of Yi Cheng, Lucia Cheung, Angie Yan, Chong Han, Ikhlal Abdulsaid, Souheil Afara, Jingjing Li, Aihua Chen, Dorothy Lim and Poupak Mehrani. Dinah Laprairie, acting for the Canadian Society for Chemical Engineering and The Chemical Institute of Canada, has been extremely helpful. The assistance of Tom Smith of Gilmore Printing Services in Kanata is also greatly appreciated. Members of the Canadian Advisory Committee for the CFB7 Conference, listed on the next page, have provided excellent advice and helped out cheerfully whenever asked. We are also grateful to the International Advisory Committee, whose members are again listed below, under whose auspices this conference has been organized, for returning to Canada, host of the very first International Circulating Fluidized Bed Conference organized by Professor Prabir Basu (Halifax) in 1985. Finally we thank the financial sponsors who have helped permit students and attendees from abroad to attend the conference. These sponsors will be fully recognized at the conference itself.

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