Arun S. Mujumdar Medal Mini-Symposium, 2020-2021

April 29, 2022

12:00 PM (UTC) onwards

About Arun S. Mujumdar Medal

Arun S. Mujumdar Medal recognizes individuals who have made outstanding contributions in R & D in drying technology, distinguished mentorship of young researchers, and excellent professional services. It is the highest honor in the drying community. The Medal was instituted by former students and research associates of Professor Arun S. Mujumdar around the world with the endorsement by the drying Guru.

Since its establishment in 2007 at the 5th Asia-Pacific Drying Conference (ADC 2007), 15 Medals have been awarded. Medal recipients have so far been selected by an ad-hoc committee composed of Dr. Guohua Chen (Chair), Dr. Arun S. Mujumdar, and the Chairman of the regional drying conferences or international drying symposia, based on the nominations received.

Because of the COVID-19 pandemic, many conferences/symposia have been postponed, cancelled or switched to online mode. Consequently, there have not been any Arun S. Mujumdar Medals given in the past two years. This break also gives us an opportunity to standardize the procedures as well as the format of the Medal for future recipients.

2020-2021 Medal Awardees

Takeshi Furuta,
Tottori University, Japan

Zhanyong Li,
TUST, China

Antonello Barresi,
Politecnico di Torino, Italy

Tadeusz Kudra,
Dalhousie University, Canada

Arun S Mujumdar Medal Mini Symposium

4 Medal Winners | Mini Book of Abstracts

Keynote Speaker-01

2020-2021

Takeshi Furuta
Tottori University, Japan

Prof. Takeshi Furuta, is currently Emeritus Professor of Food Engineering in the Graduate School of Engineering, Department of Chemistry and Biotechnology, Tottori University, graduated from the Department of Applied Chemistry and Chemical Engineering, University of Hyogo in 1966. In that same year, he was hired as a Research Associate in the Department of Chemical Engineering, Kyoto University. Later in 1983, he was appointed a Professor in the Department of Food Science, Toa University. While at Toa University, Prof. Furuta spent a year at Rutgers University (Department of Food Science) as a Visiting Professor. In 1991, he was appointed an Associate Professor in the Department of Biotechnology, Tottori University; he was later promoted in 1993 to the rank of Professor in the Graduate School of Engineering, Department of Chemistry and Biotechnology.

Keynote Title: Microencapsulation of food flavors by spray drying and their release characteristics under the humid conditions

Abstract:

Spray drying is one of the most common and economical techniques typically employed for producing dry powders from a solution, dispersion, or even paste. Microencapsulation technology of valuable food ingredients such as flavors and oils by spray drying has undergone remarkable development since the past decade. Microencapsulation in matrices of carbohydrate and/or protein is considered a preferable method to permit longer storage of these substances, which are generally highly susceptible to oxidation and thermal deterioration. These core materials, normally in liquid form, are converted into powders through mixing with wall materials (often soluble carbohydrate and/or protein). Among the several techniques available, spray drying is the most commonly employed for microencapsulation of food ingredients. Because spray drying usually utilizes a drying medium of high temperature, it is often regarded as a 'harsh' method.

In this presentation, I'd like to present my research works on the microencapsulation of food flavors by spray drying and their release characteristics in humid conditions.

The main topics of my talk are as follows:

- Microencapsulation of hydrophilic flavors by spray drying; Encapsulation mechanism of flavor in the droplet by drying.
- Microencapsulation of hydrophobic flavors by spray drying; Morphology of the spray-dried particles; Presence of flavor emulsions inside the spray-dried powder.
- Sustained release behavior of the encapsulated emulsified flavor from spray-dried powder; Kinetic analysis of the release rate of flavor at various relative humidity.
- Evaluation of flavor release from spray-dried powder by ramping/step-wise with dynamic vapor sorption–gas chromatography.

ASM Medal Mini Symposium- Keynote Lecture-01

Takeshi Furuta
Tottori University, Japan

Contact: furuta@sun.ocn.ne.jp

Keynote Speaker-02

2020-2021

Zhanyong Li
Tianjin University of Sci.& Tech., China

Prof. Zhanyong Li, is a Professor, the Department of Process Equipment & Controlling Engineering, Tianjin University of Science and Technology (TUST). He obtained his B.Eng. and M. Eng. at TUST (formerly known as Tianjin Institute of Light Industry) respectively in 1990 and 1994 with research in vibrated fluidized-bed drying. After working as a Lecturer for four years, he went to Nagoya University for further study and obtained his PhD there in 2002 in sorption drying. He returned to TUST in 2004 to assume his professorship after two years of postdoctoral research work at Nagoya University. Among many of his institutional services, Prof. Li was the Dean, the School of Engineering, and also Vice President (Education).

Keynote Title: Role of Particle Carriers In Drying Processes

Abstract:

In some drying processes, a dissimilar particle can be introduced as a carrier or medium, called a particle carrier, to distribute the liquid material on it, disperse the solid material in fluidization, or regulate the electromagnetic field in dielectric drying, etc., so as to achieve a high intensity of heat and mass transfer with desired product quality. In our research, a highly heat-sensitive and xerolabile suspension of photosynthetic bacteria was dried in batch and continuous vibrofluidized beds of porous and nonporous solid carriers. Corn bran was served as an active sorbent to adsorb the viscid spent liquor from yeast fermentation, and wet granules were then dried in a fixed bed by the hot air stream. Interestingly, it was found that conditioning the spent liquor–bran mixture for a period before drying markedly improves the drying rate. For fluidized bed drying of large particles, the addition of small particles improves the fluidization quality with intensive phase mixing. On the other hand, a particle carrier, as a skeleton structure for heat transfer or an internal heat source in the case of microwave irradiation, can be applied to freeze-drying. Randomly moving conductive particles help to distribute the microwave electric field and then improve the uniformity of microwave heating. Furthermore, metallic particle carrier in an induction heating reactor for fast pyrolysis of reed straw can intensify the decomposition reaction and produce higher quality bio-fuels. Other related works involving particle carriers were also briefly presented.

Zhanyong Li
TUST, China

Contact: zyli@tust.edu.cn

Keynote Speaker-03

2020-2021

Antonello Barresi
Politecnico
diTorino, Italy

Prof. Antonello Barresi is the author of more than 250 research articles, of which more than 190 are Scopus indexed and 83 about drying; the h-index at the time of this writing (November 2021) is 37. He has also contributed to several books and, in particular, to the book series "Advances in Drying Science & Technology" (CRC Press) edited by Prof. A. S. Mujumdar, first as an author of a chapter in the book "Intelligent Control in Drying" (edited by A. Martynenko and A. Bück) and then as a Co-Editor of the book "Freeze-Drying of Pharmaceutical Products." Prof. Barresi, with his team, holds several patents, both in Italy as well as in the EU, USA, and China, on process analytical technologies for monitoring a batch freeze-drying process, aiming at evaluating if the target critical quality attributes are obtained, and for controlling the process, aiming at minimizing the cost of the process and therefore of the final product. Some of these patents have been commercialized.

Keynote Title: Freeze-drying process development and control - A model-based approach

Abstract:

Freeze-drying is a process widely used to recover pharmaceuticals from aqueous solutions. Although regarded as a soft dehydration process, due to the low operating temperature, the total or partial inactivation of the product is not unusual. A model-based approach can be very effective to improve quality and reduce the variance of the product, to optimize and develop freeze-drying cycles, to monitor and even to control them, to improve equipment design

Finally, modeling may be important for risk analysis, to predict the influence of stochastic phenomena or, considering the last developments, by molecular dynamics simulations, to understand fundamental mechanisms of protection and deactivation of labile substances like proteins and enzymes, and to help the development of formulations and choice of materials.

Lastly, equipment design can affect product quality and batch heterogeneity during operation (mainly during primary drying), through pressure gradients in the drying chamber and temperature gradients over the various shelves, beside the well known effect of radiation. The use of Computational Fluid Dynamics can be very effective to improve the design not only of the drying chamber, but also that of the condenser, and for a selection of duct size and valves that assure the required performances.

Antonello Barresi
Politecnico diTorino, Italy

Contact: antonello.barresi@polito.it

Arun S Mujumdar Medal Mini Symposium

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Keynote Speaker-04

2020-2021

Tadeusz Kudra
Dalhousie University, Canada

Dr. Tadeusz Kudra retired in 2013 as Senior Research Scientist at CANMET Energy Technology Centre, Varennes, QC, Canada; formerly Associate Professor at Lodz Technical University (Lodz, Poland), Adjunct Professor at McGill University (Montreal, Canada), University of Manitoba (Winnipeg, Canada), Laval University (Quebec, Canada), and University of Ottawa (Ottawa, Canada). Currently, Dr. Kudra holds the position of Adjunct Professor at Dalhousie University (Truro, NS, Canada). The author of over 200 papers, 40 conference presentations, 28 book chapters, and books including Drying: Principles, Applications, and Design; Advanced Drying Technologies and Thermal Processing of Biomaterials. He is the holder of 12 patents and the recipient of numerous honors, including the prestigious IDS awards for Distinguished Professional Contribution to Drying Technology (IDS'96) and for Excellence in Drying: Transferring Fundamental Results into Practice (IDS'2004). He is also an Honorary Professor at Tianjin University of Light Industry (China), and Tambov State Technical University (Russia).

Keynote Title: Electrohydrodynamic (EHD) drying

Abstract:

Electrohydrodynamic (EHD) drying refers to the removal of water from a wet material exposed to a strong electric field due to the aerodynamic action of the so-called "ionic", "electric" or "corona" wind. This wind originates from a vertical sharp and electrically charged pin as a result of ions leaving the conical tip of this pin and impinging the surface of a dried material deposited on a flat collecting electrode of the opposite charge. The same ionic wind originates also from a fine horizontal wire suspended above the drying material.

The ionic wind is composed of ionized air molecules, neutral molecules, and electrons that all drift from the discharge electrode to the collecting grounded electrode. Such a drift that results in the bulk flow of air and the stream of charged constituents has a convective nature. Therefore, the EHD drying is at least 3-4 times more effective than the mechanically-induced convective drying. Aside from widely accepted turbulence generation and disturbance of the gas boundary layer, the other hypotheses have been put forward on the mechanism of transfer phenomena due to the impact of ionic wind. These are surface impinging, ion hydration, larger vapor concentration gradient, capillary surface tension, dipole-dipole polarization of water molecules, and double electric layer at the gas-material interface.

Accepting the convective nature of the ionic wind the EHD is a surface phenomenon because the ionic wind during impinging on the surface of a drying material disturbs the gas boundary layer. Further, owing to the depression of material temperature during drying (Martynenko and Kudra, 2018; Martynenko et al. 2019) the EHD drying is regarded as a non-thermal technology particularly suitable for dewatering of heat-sensitive materials such as fruits and medicinal plants, living cells (bacteria, yeasts, and viruses), nonliving substances of biological origin such as blood plasma, serum, hormones, enzymes, antibiotics, probiotics, nutraceuticals, and the like organic materials.

ASM Medal Mini Symposium- Keynote Lecture-04

Tadeusz Kudra
Dalhousie University, Canada

Contact: tadeusz.kudra@gmail.com

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ASM Medal Winners! 2020-2021

Date	April 29, 2022
Time	12:00 p.m. (UTC) onwards
Mode	Online Via Zoom Coferencing

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https://bit.ly/3qq25Ze

Zoom Meeting Details

Meeting ID: 387 703 7997
Passcode: 12345678

For more information contact: sachinjangam1@gmail.com

Tentative Schedule for Mini Symposium, 2020-2021

- Chair's Opening Remarks
- Congratulation remarks from Arun Mujumdar, and Presentations of ASM Medals online to the winners
- Group photo of the winners with Award Committee Members
- Keynote lectures of the symposium
- Concluding remarks (by Dr Sakamon Devahastin)

For more information contact: sachinjangam1@gmail.com

Hall of Fame in Drying Community wearing the Arun S. Mujumdar Medal as listed below in chronological order:

- **C. Strumillo,**

  Lodz Technical University, Poland (ADC2007)

- **M. Roques,**

  Universite de Pau et des Pays de l'Adour, France (IDS 2008)

- **W. J. M. Douglas,**

  McGill University, Canada (IADC 2009)

- **T. Eikevik,**

  NUST, Norway (NDC 2009)

- **S Kowalski,**

  Poznan University of Technology, Poland (PDS 2009)

- **S. Soponronnarit,**

  KMUTT, Thailand (ADC 2009)

- **G.S.V. Raghavan,**

  McGill University, Canada (IDS 2010)

- **C. Cao,**

  China Agricultural University, China (ADC 2011)

- **R. Keey,**

  University of Canterbury, New Zealand (IDS 2012)

- **J. T. Freire,**

  Federal University of Sao Carlos, Brazil (IDS 2014)

- **M. Zhang,**

  Jiangnan University, China (ADC 2015)

- **Hidefumi Yoshii,**

  Setsunan University, Japan (IDS 2016)

- **X. D. Chen,**

  Soochow University, China (ADC 2017)

- **S. Sokhansanj,**

  University of British Columbia, Canada (IDS 2018)

- **E. Tsotsas,**

  Otto von Guericke University, Germany (IDS 2018)

- **T. Langrish,**

  University of Sydney, Australia (ADC 2019)

The **Selection Committee** with fixed composition has been established for the next five years. They are:

Dr. Guohua Chen
Editorial Board Member, *Drying Technology*
Vice President, World Chemical Engineering Council

Dr. Sakamon Devahastin
Editor, Drying Technology

Dr. Arun S. Mujumdar
Editor-in-Chief, *Drying Technology*
Founder, International Drying Symposium Series

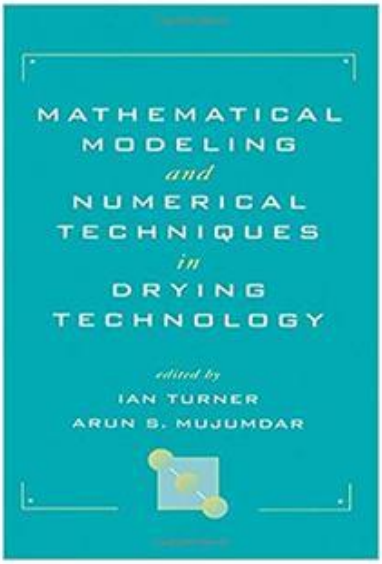
The Selection Committee would consider awarding one or two individuals each year in future. Nominations should be sent to the Secretariat:

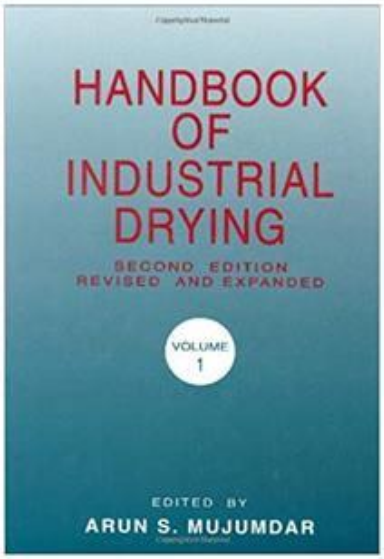
Dr. Sachin V. Jangam @ sachinjangam1@gmail.com

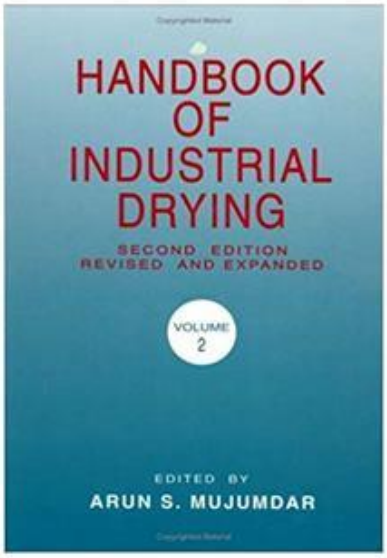
Books Edited

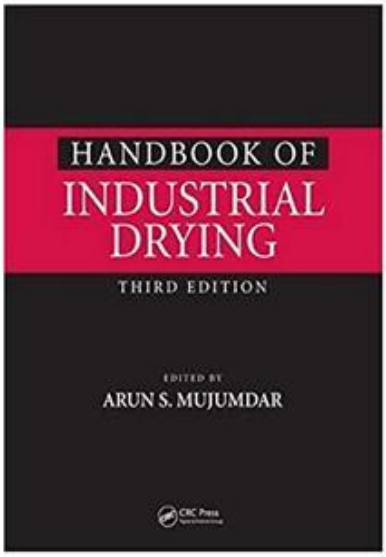
by

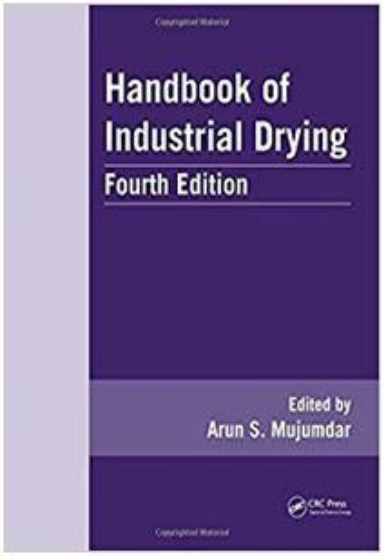
Prof. Arun S. Mujumdar

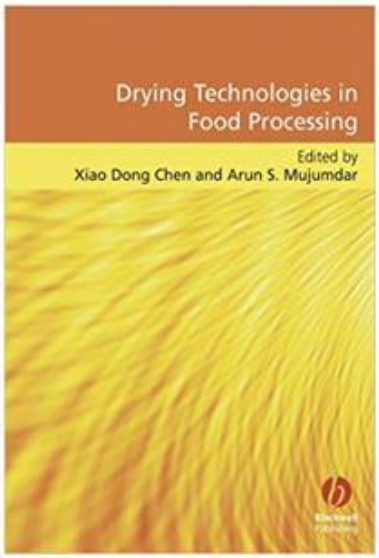










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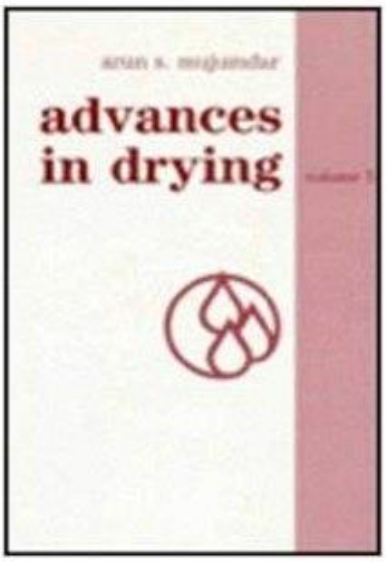
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advances
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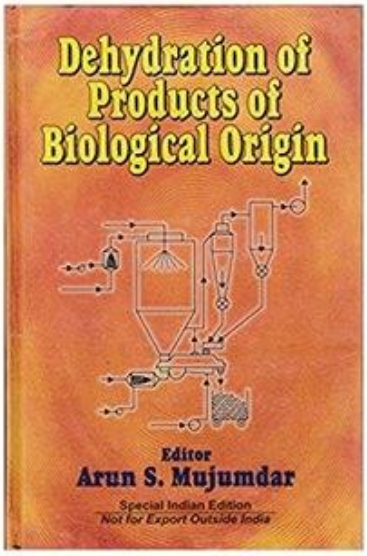
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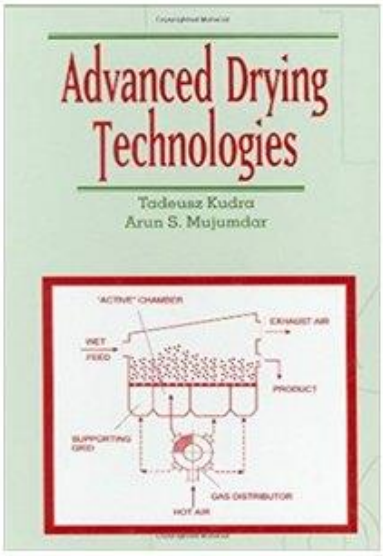
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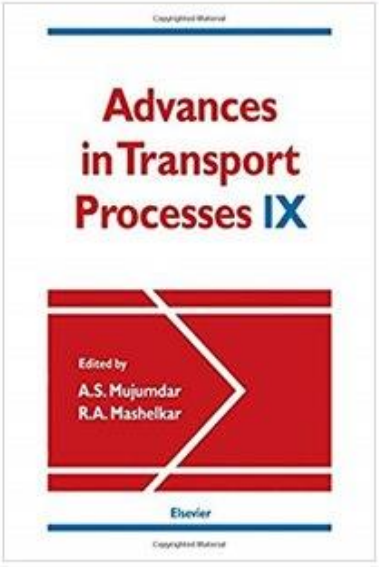
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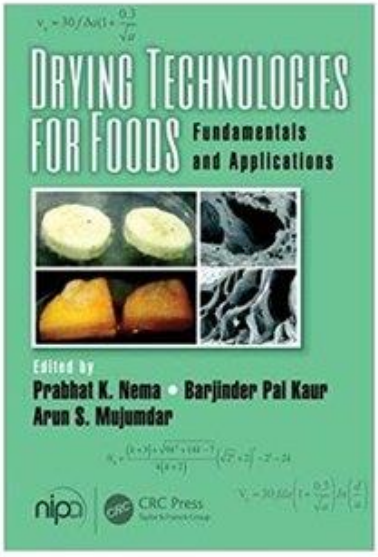
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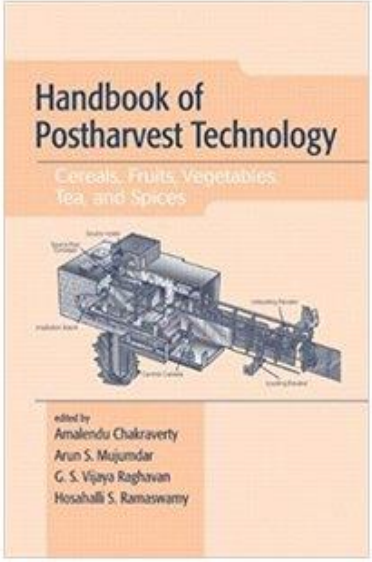
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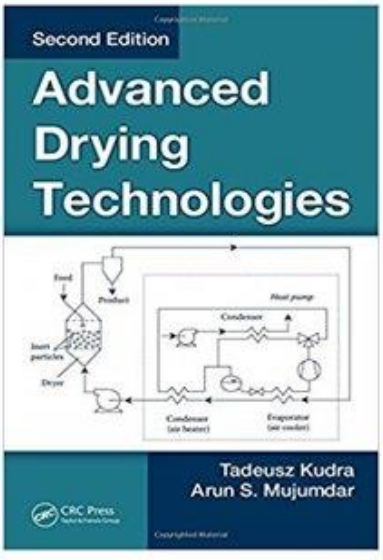
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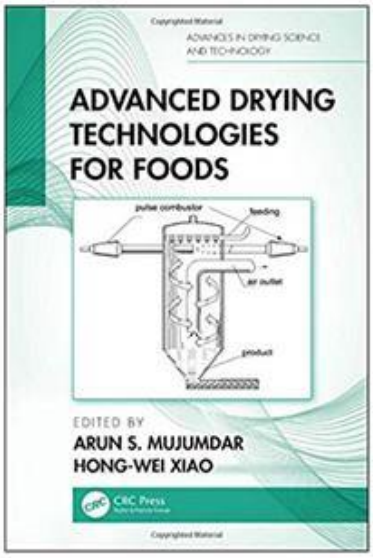
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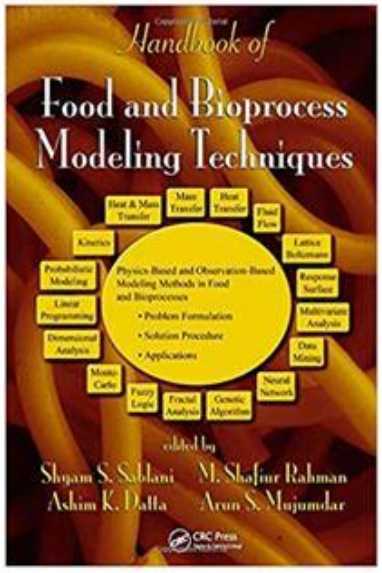
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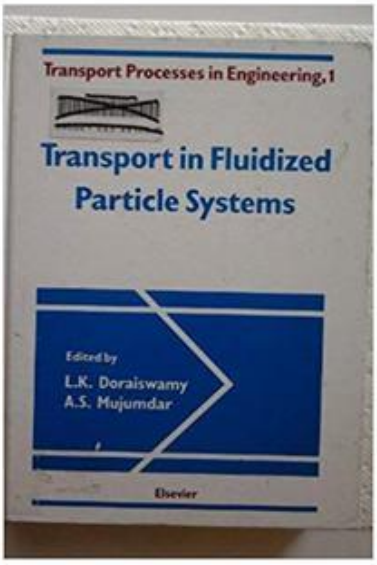
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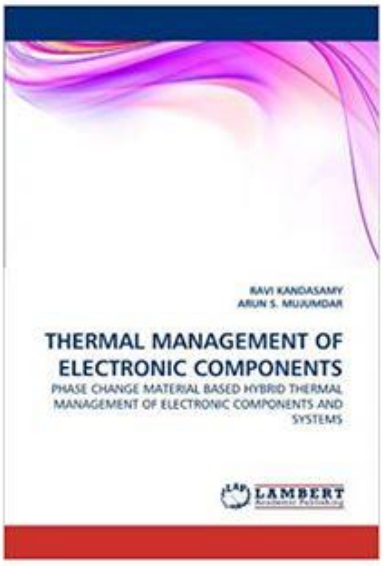
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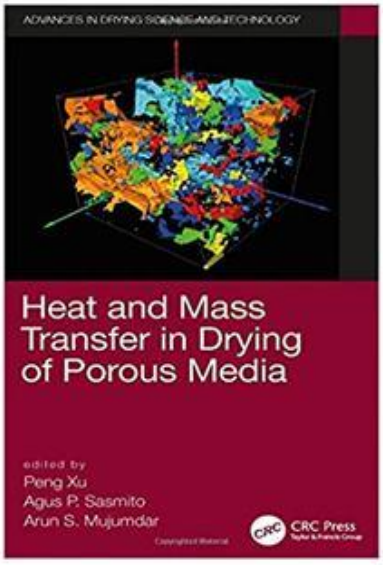
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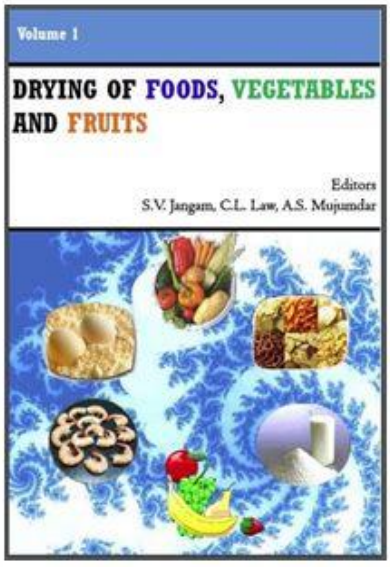

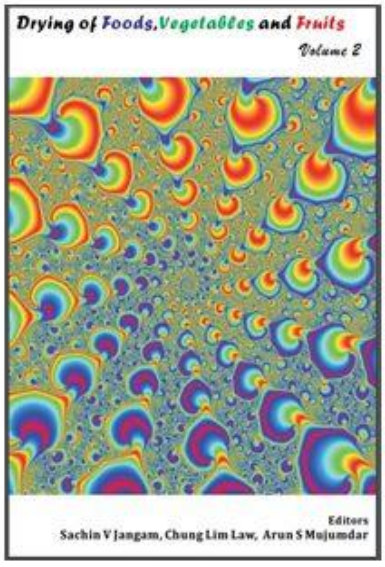

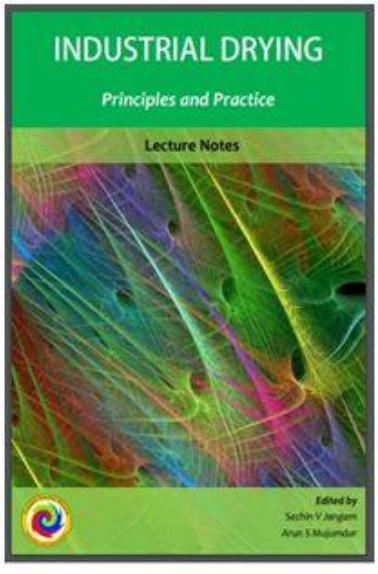

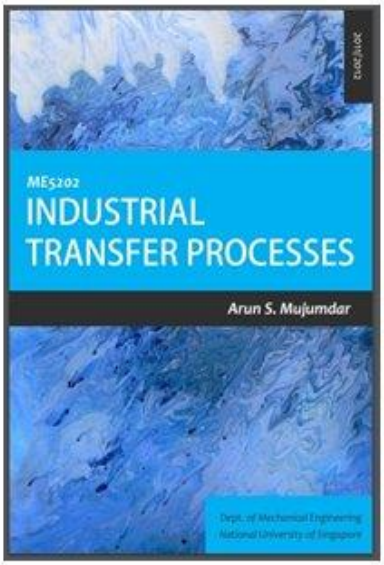
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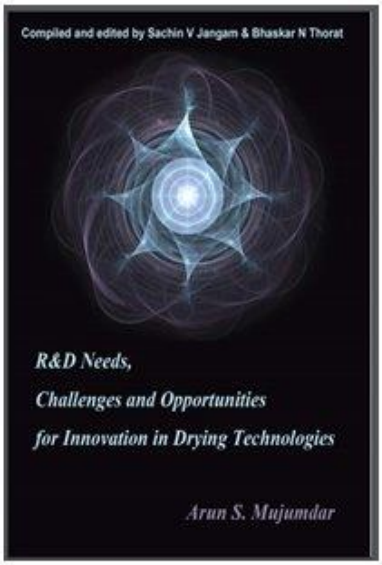
M.W.Woo, A.S. Mujumdar, W.R.W. Daud


Compiled and edited by Sachin V Jangam & Bhaskar N Thorat
R&D Needs,
Challenges and Opportunities
for Innovation in Drying Technologies
Arun S. Mujumdar


Processing and Drying of
Tropical Fruits
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Law, C.L., Hii, C.L., Jangam, S.V., Mujumdar, A.S.


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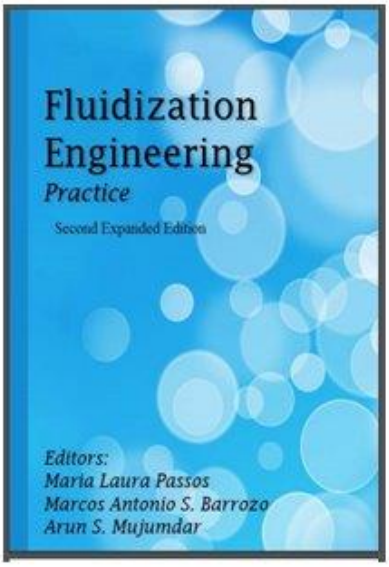
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Editors:
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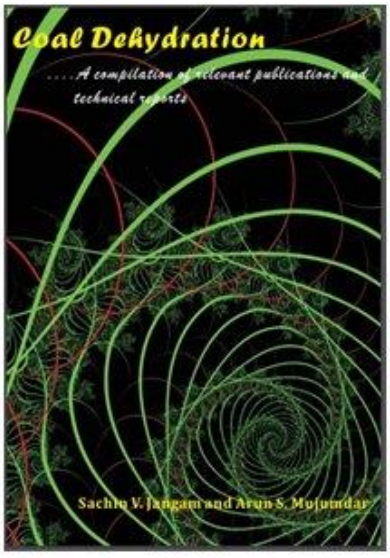
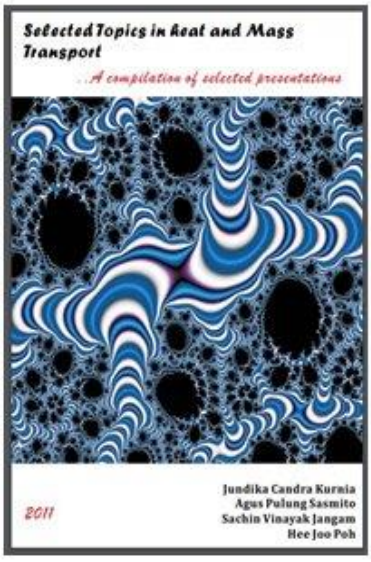

Coal Dehydration
....A compilation of relevant publications and technical reports
Sachin V. Jangam and Arun S. Mujumdar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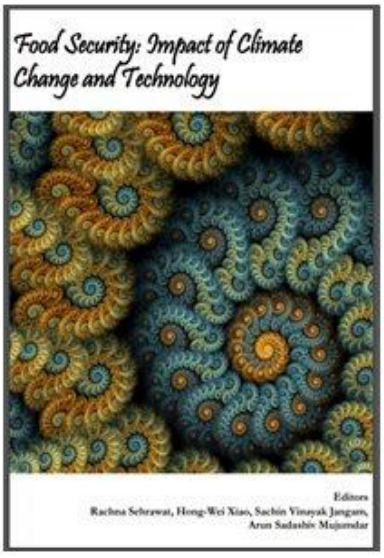
Sachin Vinayak Jangam
Hee Joo Poh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Editors
Rachna Sehrawat, Hong-Wei Xiao, Sachin Vinayak Jangam,
Arun Sadashiv Mujumdar

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