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Book Review

“Nanoparticle Technology Handbook (third edition)” edited by Makio Naito, Toyokazu Yokoyama, Kouhei Hosokawa and Kiyoshi Nogi

A “powder”, which is an assemblage of small solid particles, exhibits very unique behavior. For example, depending on the circumstances, a powder can behave like a gas, a liquid, or a solid. Furthermore, because of the larger specific surface area relative to its bulk counterpart, powders can have very distinct properties. This is especially true for “nanoparticles”. The unique behavior and properties of particle and powder give them a wide range of industrial applications that makes them ubiquitous in our daily lives. Particles and powder are also building blocks to make promising materials for creating scientific and technical innovations in the future.

Mr. Masuo Hosokawa, the chief editor of the first edition of this Handbook, was a pioneer in this industry. When he was the President of Hosokawa Micron Corp., he founded Hosokawa Powder Technology Foundation in 1991 to contribute to the advancement of powder technology on a global scale, and published the first issue of “KONA Powder and Particle Journal” in 1983. Since then, KONA has been published annually, and distributed worldwide.

Mr. Hosokawa proposed the concept of “nanoparticle technology” long before the United States President Bill Clinton’s National Nanotechnology Initiative in 2000. One of the activities of the Foundation was to publish the Nanoparticle Technology Handbook in Japanese in 2006, which was translated into English and published its first edition of this Handbook in 2007. Nanoparticle technology advanced considerably after 2007, prompting Mr. Hosokawa to start preparing an updated second edition of the Handbook. He unfortunately passed away on March 31, 2010 before the second edition was published in 2012.

Because nanoparticle technology has rapidly evolved since 2012, and has been applied more broadly in new areas, Mr. Yoshio Hosokawa, the second President of Hosokawa Powder Technology Foundation and President of Hosokawa Micron Corporation decided to publish a third edition of the Handbook. In this third edition, the applications section of the Handbook has been updated to include the most recent advances in nanoparticle technology. Nineteen chapters have been added. The 79 chapters in the applications section are organized into four categories as shown in **Table 1**. The third edition has totally 877 pages including fundamental part as shown in **Table 1**. Over 140 experts in nanotechnology and/or powder technology contributed to this new edition.

Nanoparticle technology is a new and revolutionary technology. It handles the preparation, processing, application and characterization of nanoparticles and has become the core of nanotechnology as an extension of conventional fine particle/powder technology. Nanoparticle technology plays an important role in the implementation of nanotechnology in many engineering and industrial fields.

I hope the third edition will give readers state-of-the-art information and knowledge to develop their own innovative technologies and new products, further enhancing our understanding of the fundamentals of nanoparticle technology.

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Author's Short Biography

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Makio Naito is a professor at the Joining and Welding Research Institute (JWRI), Osaka University in Japan. He received his Ph. D. degree in chemical engineering from Nagoya University in 1987. He served as the President of The Society of Powder Technology, Japan from 2015 to 2019. His publications cover a wide range of studies in the fields of advanced materials and novel powder processing and characterization. He has authored or coauthored more than 300 refereed journal papers and 120 review articles. He has contributed 80 books, edited 27 books and holds more than 60 patents. He has received several prestigious awards including the Richard M. Fulrath Award from the American Ceramic Society (ACerS) in 2002 and the KONA Award in 2019. He has been a Fellow of the ACerS since 2010, and serves on the ACerS Board of Directors from 2020. He has been a Professional Academy Member of the World Academy of Ceramics since 2012, and has served on the Academy's Advisory Board since 2018.