

# Preface

Abrasive technology concerns the manufacturing processes that involve the use of abrasives in a variety of forms. It has a long history originating from the discovery of minerals. With the increasing requirements for the production of high precision and high surface quality components in various applications, such as silicon wafers in the semiconductor industry and optical lenses in the precision instrument industry, abrasive technology is becoming increasingly important in precision manufacturing. An understanding of the mechanisms of abrasive technology enables to ensure the soundness and good integrity of components manufactured as well as to effectively develop new techniques.

Following the previous nine publications in 1997, 1998, 2000, 2001, 2002, 2003, 2004, 2005 and 2006 in the series of “Advances in Abrasive Technology” and the publications of “Abrasive Technology – Current Development and Applications I” in 1999 and “Precision Grinding and Abrasive Technology” in 2007, this book presents the latest development in this field, spanning from the fundamentals to new techniques and applications.

This book is a collection of 88 selected papers contributed from around the world through a rigorous peer-review and revision process for their originality and quality. The topics covered in this book include new development and applications in grinding, polishing, CMP, silicon wafer processing and field-assisted abrasive machining technologies, novel techniques and new understanding of dressing and truing for grinding processes, and other novel abrasive technologies such as abrasive jet processing. It also covers other topics relevant to precision manufacturing, including nano-processing of brittle materials, precision measurement and evaluation of high precision components, micro-fabrication, and advanced machining technologies such as ecological and high-speed machining.

We believe that this book provides a valuable reference for researchers in the abrasive technology field who wish to further understand the underlying mechanisms and create new and practical technologies, systems and processes. It should also be particularly useful for practicing engineers in precision manufacturing who are responsible for the efficient and effective operations.

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