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BOOK REVIEW

O. Tabata and T. Tsuchiya (eds.): Reliability of MEMS: Testing of Materials and Devices

Wiley-VCH, Weinheim, xx + 303 pp, £110, ISBN 978-3-527-31494-2

S. M. Spearing

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The book is the sixth in a series on Advanced Micro and Nanosystems. The volume editors, Professors Tabata and Tsuchiya, have undertaken the challenging task of producing a coherent work on the reliability of Microelectromechanical Systems (MEMS). This is an increasingly important topic as MEMS are used as components of safety-critical systems, for example as accelerometers and gyroscopes for air-bag deployment and roll-prevention in automobiles. In addition, MEMS are found in consumer products such as projection displays, ink-jet printers and games consoles where reliability can be an important key selling point. This volume represents the first such work focused on the topic of MEMS reliability and as such it represents an important contribution.

The book consists of two distinct parts: the first five chapters provide reviews of approaches to mechanical property measurements of MEMS materials and structures. The second group of five chapters presents case studies of reliability issues found in particular MEMS. The chapters have been contributed by recognised experts as well as established practitioners in the field. The chapters on mechanical property measurement constitute a quite comprehensive review of the topic, spanning issues of; standardization, indentation testing, bulge testing, tensile testing and on-chip testing approaches. The case studies include; a pressure sensor, inertial sensors (two chapters), an optical attenuator and a resonant mirror. In these later chapters the quality of coverage is more variable than in the first part, which is attributable to the proprietary nature of some of the case studies that are presented. In particular, it would have been desirable to have provided more quantitative treatments of overall device reliability. It would have also been preferable to have established a closer link between the first half of the book and the case studies in the second half. In particular there is no detailed coverage of important topics such as stiction, thermal expansion mismatch, particle contamination and electrical aspects of reliability, which are all identified as contributions to the overall system reliability in the case studies.

Notwithstanding the limitations, the editors have produced a very useful reference book. They have made a very creditable effort at covering a broad and diverse topic. The book will undoubtedly be of interest to MEMS practitioners and researchers. The combination of a very good review of micromechanical test approaches with useful insights into reliability issues and ameliorating approaches in particular MEMS works well and establishes a good benchmark for future contributions in this field.

S. M. Spearing (✉)
School of Engineering Sciences, University of Southampton,
University Road, Southampton O17 1BJ, UK
e-mail: s.m.spearing@soton.ac.uk