

Preface

Microelectromechanical systems (MEMS) and nanoelectromechanical systems (NEMS) are miniaturized devices, quite often with a transducer function, and with the smallest structural dimensions of 100 μm or 100 nm, respectively. Due to the small dimensions, the production technology applied is rather different from that of macroscopic systems. Processes often are more similar to those used in the semiconductor industry, without, however, reaching even closely this industry's process standardization.

This book is intended for the university student, technician, engineer, manager, or scientist who would like to expose herself or himself to the field of MEMS and NEMS fabrication. While the main emphasis is on technology, the book also provides theoretical background on selected subjects, allowing a better understanding of physical and chemical technological basics.

As an introduction, Chap. 1 presents a brief look into the history of MEMS (contributed by Richard S. Muller, UC Berkeley). Chapter 2 examines the nature of *Vacuum Technology*. Chapters 3 and 4 discuss *Deposition and Etching Technologies*, respectively, two of the key technologies of micro and nano fabrication. Chapter 5 covers *Doping and Surface Modification* technologies. Chapter 6 confers on the third key technology: pattern transfer by *Lithography*. Chapter 7 presents a unique technology for fabricating high aspect ratio microparts closely related to lithography: *LIGA*. Chapter 8 discusses *Nanofabrication by Self-assembly*. Chapters 9 and 10 present Enabling Technologies: *Wafer Planarization and Bonding* as well as *Contamination Control* by cleaning and production in a cleanroom. Chapter 11 concludes the book with a MEMS fabrication sample.

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