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芯片制造
——半导体工艺制程实用教程

（第六版）

Microchip Fabrication

A Practical Guide to Semiconductor Processing

Sixth Edition

[美] Peter Van Zant 著

McGraw Hill Education

電子工業出版社
PUBLISHING HOUSE OF ELECTRONICS INDUSTRY
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内容简介

本书是一本介绍半导体集成电路和器件制造技术的专业书籍，在半导体领域享有很高的声誉。本书的范围包括半导体工艺的每个阶段：从原材料的制备到封装、测试和成品运输，以及传统的和现代的工艺。全书提供了详细的插图和实例，每章包含回顾总结和习题，并辅以丰富的术语表。第六版修订了微芯片制造领域的新进展，讨论了用于图形化、掺杂和薄膜步骤的先进工艺和尖端技术，使隐含在复杂的现代半导体制造材料和工艺中的物理、化学和电子的基础知识更易理解。本书的主要特点是避开了复杂的数学问题介绍工艺技术内容；加入了半导体业界的新成果，可以使读者了解工艺技术发展的趋势。

本书可作为高等院校电子科学与技术专业和职业技术培训的教材，也可作为半导体专业人员的参考书。

Peter Van Zant.
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Preface

From the Preface of the *First Edition*: "As the semiconductor industry becomes more important in the economy, more people will be involved in the industry. It is my intention that *Microchip Fabrication* will serve their needs."

Indeed the semiconductor industry has grown into a major international industrial segment. The semiconductor materials and equipment industries have also grown into major industrial sectors. This edition has followed the goal of the *First Edition* to serve the training needs of wafer-fabrication workers, whether they be production workers, technicians, professionals in the materials and equipment sectors, or engineers.

The *Sixth Edition* retains the physics, chemistry, and electronic fundamentals underlying the sophisticated manufacturing materials and processes of the modern semiconductor industry. It goes on to profile the state-of-the-art processes that have grown from the simple laboratory productions lines of the 1960s. Not every individual process flow can be detailed in an introductory text. But current technologies used in the patterning, doping, and layering steps are explained. The intention of this book is that the reader will gain enough general knowledge to be able to keep abreast of new processes and equipment.

I am indebted to the valuable input from Anne Miller and Dr. Michael Hynes at Semiconductor Services, Bill Moffat the founder and President of Yield Engineering Systems, and Don Keenan, process engineer extraordinaire.

Kudos to Senior Editor Michael McCabe and his staff at McGraw-Hill for their support and guidance. And a thanks to Sheena Uprety, Associate Project Manager at Cenveo Publisher Services, and the copyeditor, Ragini Pandey, for turning my manuscript into a ready-for-production text.

And, of course, a shout out to my ever supportive and patient wife, Mary DeWitt. She edited the first edition, has given me encouragement during the writing of every edition, and has lent her eagle eye to this latest edition.

Note to Instructors: If you are an instructor using this book as a textbook, then there is an Instructor's Manual available at www.mhprofessional.com/mf6e.

Peter Van Zant

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