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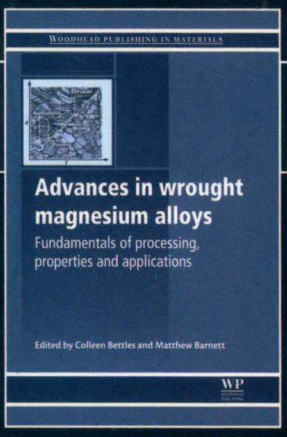

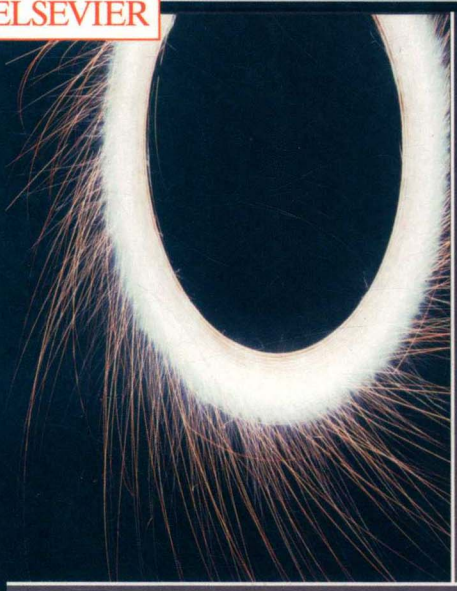

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Advances in Wrought Magnesium Alloys: Fundamentals of Processing, Properties and Applications

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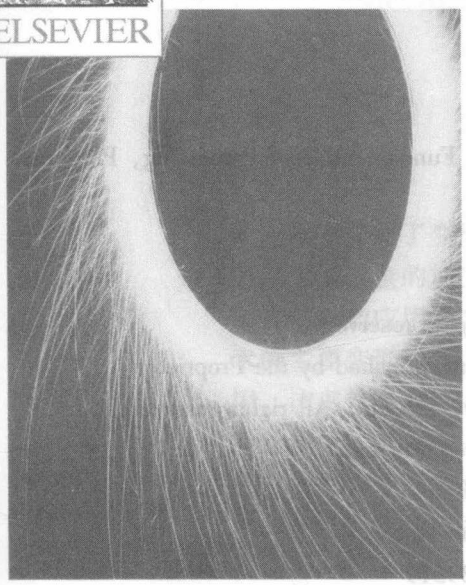

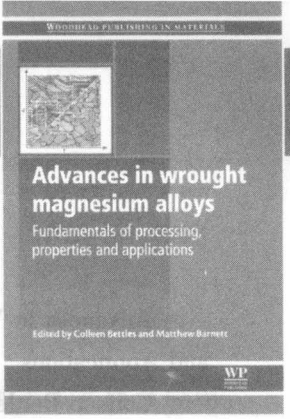

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变形镁合金研究进展：加工原理、性能和应用

BIANXING MEIHEJIN YANJIU JINZHAN: JIAGONGYUANLI、XINGNENG HE YINGYONG

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内容简介

本书介绍了变形镁合金的类型与性能、加工工艺以及应用。总结了镁合金的加工过程对其性能的影响，讨论了可用于开发新一代高性能应用合金的方法，介绍了铸造、挤压、轧制和锻造技术的主要变形行为以及锻造镁合金在汽车和生物医学工程中的应用。该书作者 Colleen Bettles 教授为澳大利亚莫纳什大学轻金属设计优化 ARC 中心副主任，Matthew Barnett 为墨尔本迪肯大学教授。该书为变形镁合金领域的必备参考书，适用于镁合金材料技术、研究人员以及相关本科生、研究生使用。

序

“最早的商用合金含有铝、锌、锰、硅和铈，这些元素仍然是当今绝大多数商用二元和三元合金的主要成分。”1940 年 W. Buchmann这样写道，当时全世界镁的产量正呈上升趋势。70 多年后，这些话大体上还是没有错的。

70 多年来，镁的产量波动明显，但最近镁及镁合金在越来越多的主流应用方面已经复苏。传统上，铸造一直是镁合金占主导地位的加工路线，但在过去十年中变形镁合金已在许多结构应用中变得重要。

市场对镁合金的最终性能要求越来越高，而希望价格越来越低。变形镁合金产品的未来将高度依赖巧妙的合金设计(结合化学和镁合金基本变形行为的理解)和优化的二次加工阶段，例如轧制、锻造和挤压。

本书提供了一个独特的机会，让来自众多不同学科的专家同心协力，推动变形镁合金成功实现在非尖端领域的广泛应用。这本书分为 3 个部分，首先介绍最新发展趋势，我们可能最后会脱离 W. Buchmann 的观点，接下来探讨变形行为的最重要的基本原理。这些章节是优化加工步骤的基础，且第 2 部分着重阐述大量不同加工工艺。结论章节讨论未来变形镁合金产品的应用。

我们要感谢本书的所有撰稿人，他们为本书付出了辛勤劳动，作出了专业贡献。我们还要感谢伍德海德出版社的编辑人员，他们提出出版变形镁合金著作的建议并将相关内容汇集，使本书出版成为可能。

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Introduction

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'Even the earliest of these commercial alloys contained aluminium, zinc, manganese, silicon, as well as cerium, all of which remain today the principal constituents of the majority of commercial binary and ternary alloys'. So wrote W. Buchmann[1] in 1940, when the world-wide production of magnesium was on an upwards trajectory. Those words are still true today, by and large, some 70 years later.

Production tonnages have fluctuated markedly over this time but recently we have seen a resurgence in the use of magnesium and its alloys in an increasing number of mainstream applications. Traditionally, casting has been the dominant processing route, but in the last decade wrought products have found a place in many structural applications.

The final property requirements have been increasing, seemingly in an inverse fashion to pricing requirements. The future of wrought magnesium products will be highly dependent on clever alloy design (combining chemistry and an understanding of the fundamental deformation behaviours of magnesium alloys) and optimisation of the secondary processing stages such as rolling, forging and extrusion.

This book provided a unique opportunity to bring together experts from the many and varied disciplines that are necessary to successfully achieve the widespread adoption of wrought magnesium in non-niche applications. The book is divided broadly into three parts, beginning with an update on alloy trends, showing that we may at last be breaking away from the comment by Buchmann, and following this with chapters discussing the most important fundamental aspects of deformation behaviour. These chapters are the building blocks from which the optimisation of the processing steps can be constructed, and the second part of the book looks at a number of different processing routes. The concluding chapters are used to discuss the applications that will be available to wrought magnesium products in the future.

We would like to thank all the contributors to this book for their hard work and dedication to their particular fields of endeavour. We would also like to thank the editorial staff at Woodhead Publishing for firstly suggesting that wrought

magnesium deserved a book of its own, and secondly for all their efforts in bringing the contents together and making the book possible.

Reference

1. Buchmann, W. (1940). In *The Technology of Magnesium and its Alloys*. Ed: Beck, A. London, FA Hughes.

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