Materials and Design
The Art and Science of Material Selection in Product Design
Second Edition
Preface

Books on material selection – and there are many – focus on finding a match between material properties, the technical requirements of a design, and the science of materials. There are now well-developed methods for doing this, supported by sophisticated software tools. Together they form the basis for the teaching of materials selection in engineering programs around the world. But these programs frequently ignore or at best devote little attention to what might be called the art of materials – the role they play in industrial design. This may be because the more technical aspects of engineering form a structured, analytical field that can be recorded and taught as a set of formal procedures. Design cannot so easily be formulated as a method; it relies instead on “visual” thinking, sketching and modeling, an exploration of aesthetics and perception, and storytelling.

This book is about the role of materials and processes in product design. It complements an earlier text that develops methods for choosing materials and processes to match the technical requirements of a product. Here, by contrast, the emphasis is on a wider range of the information about materials that designers need, the way they use it and the reasons they do so.

The reviews received and conversations we had with students, professors and working designers about the first edition of this book have encouraged us (and the publishers) to capture new experiences, new ideas and recent developments in industry in a second edition. With help from Willy and Patrick at Swayspace, we also spent time rethinking the design, layout, color and content of the book in order to enhance the message and its presentation. We have included new case studies, derived from the experiences that one of us (KJ) had working with IDEO. And these case studies illustrate the idea of materials and design in a way that is more complete and more inspiring. Based on Mike’s recent work, there is an increased emphasis on sustainability and issues related to eco- and “green” design. The material and process profiles, too, have expanded slightly and have improved photography to make them more accessible and more inspirational.

The book has two audiences: students and working designers. For students, the purpose is to introduce the role of materials in and manufacturing in design, using language and concepts with which they are already familiar. For working designers, the purpose is to present a concise reference source for materials and manufacturing, profiling their characteristics. To this end, the book is divided into two parts. The first presents ideas about design and methods of material selection; the second is devoted to the profiles.

Many colleagues have been generous with their time and ideas. In particular, we are grateful for discussions, criticisms, contributions and construc-
tive suggestions from Professor Yves Brechet of the University of Grenoble; Dr. David Cebon, Dr. John Clarkson, Dr. Hugh Shercliff, Dr. Luc Salvo, Dr. Didier Landru, Dr. Amal Esawi, Dr. Ulrike Wegst, Ms. Veronica Lemercier, Mr. Christophe LeBacq and Mr. Alan Heaver of Cambridge University; Dr. Pieter-Jan Stappers of the Technical University of Delft; Dr. Torben Lenau of the Technical University of Denmark; and Julie Christensen of Surface Design, San Francisco. In the second edition, we were able to include case studies from IDEO and we deeply appreciate the opportunity to continue to work with IDEO to explore the role of materials in design. We owe a special thanks to Nicolas Zurcher from IDEO and Jihoon Kim from IDTC who were each willing to share some of their images for the material and manufacturing profiles. We particularly wish to acknowledge the contribution of Willy Schwenzaefer and Patrick Fenton of Swayspace, New York, to the design of the book itself. Many other people and organizations, listed on the following page, contributed images or gave us permission to reproduce their images and photographs of their products.

Mike Ashby and Kara Johnson
June 2009

Our Top Five Lists
As part of the preface to this book, we would like to include our own Top 5 lists for books that serve as good reference, inspiration and learning for materials and manufacturing. These books help us remember to get inside the factory, to focus on visualization, to explore design basics and to experiment.

Mike Ashby

Kara Johnson
Acknowledgements

ALPA of Switzerland
Capaul & Weber
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Antiques Collectors’ Club
5 Church St
Woodbridge, Suffolk
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6 Blundell St
London N7 6bh
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Arnoldo Mondadori Editore S.p.A.
Milan
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Bang and Olufsen, UK
630 Wharfdale Rd
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Dyson
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Ergonomic Systems Inc.
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Gisela Stromeyer
Architectural Design
165 Duane St #2B
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Admirilitätstrasse 71, 20459
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IDEO
100 Forest Avenue
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IDTC (International Design Trend Center)
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MAS Design
Axis House, 77A
Imperial Rd
Windsor SL4 3RU
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Nokia Group
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Flugplatzstrasse 29
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Japan
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CHAPTER 2 · What Influences Product Design?  
CHAPTER 3 · Design and DESIGNing  
CHAPTER 4 · The Stuff... Multi-dimensional Materials  
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