

Contents

Foreword from the European Commission	5
Dear Reader	7
Introduction.....	8
Methodology of Roadmapping	10
Today's Materials Technology from a Global Perspective	13
Mapping and Bibliometrics	13
Development of Materials Research	13
Relevance of Materials Technology for Different Industrial Sectors	14
Global Mapping of Materials Research Activities	17
Materials Research Regions in Europe	19
Tomorrows Materials Innovations - Looking ahead	22
Foresight: Materials Innovation Demands by Society	22
Screening for Materials' "Hot- Spot" Areas.....	27
Roadmaps: Materials Powering Europe.....	30
Fission and Fusion Technologies	32
Materials for Energy Efficiency and CO ₂ Capture	35
Increasing Energy Efficiency	43
Increasing Efficiency of Power Generation	43
Energy Efficiency in Construction	44
Energy Efficiency in the Steel Sector.....	45
Efficiency in Electrical Energy Storage	46
The Hydrogen Economy	46
Materials for Sustainable Energy Technologies	52
Wind Energy	53
Hydropower, Tidal and Wave Power	55
Biomass and Waste-to-Energy	56
Solar	59
Roadmaps: Materials for a Safe Europe	66
Sensors	66
Protection	70
Roadmaps: Materials Improving our life.....	78
Biomaterials and Materials for Medical Applications	80
Improvement of Existing Implants and Medical Materials	81
Artificial Solutions with Smart Materials.....	82
Materials Research for Regenerative Medicine	87
Roadmaps: Materials for Packaging	92
Greening in Convenient and Low-Cost Packaging Materials.....	92
Materials for Intelligent and Safe Packaging	98
Roadmaps: Materials for High-Tech Textiles	101
Smart Textiles	102
Technical Textiles.....	107
Strategies to Maintain Europe's Position Strong in Materials Technology.....	113
Summary	116

Index of Figures & Tables	119
Index	121
References	125