

1. Record Nr.	UNINA9910130957603321
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Titolo	Porous silicon in practice [[electronic resource]] : preparation, characterization and applications / / Michael J. Sailor
Pubbl/distr/stampa	Weinheim, : Wiley-VCH, 2012
ISBN	3-527-64191-2 1-283-86989-6 3-527-64192-0 3-527-64190-4
Descrizione fisica	1 online resource (263 p.)
Disciplina	620.193
Soggetti	Porous silicon
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Porous Silicon in Practice: Preparation, Characterization and Applications; Contents; Preface; 1: Fundamentals of Porous Silicon Preparation; 1.1 Introduction; 1.2 Chemical Reactions Governing the Dissolution of Silicon; 1.2.1 Silicon Oxides and Their Dissolution in HF; 1.2.2 Silicon Oxides and Their Dissolution in Basic Media; 1.2.3 Silicon Hydrides; 1.3 Experimental Set-up and Terminology for Electrochemical Etching of Porous Silicon; 1.3.1 Two-Electrode Cell; 1.3.2 Three-Electrode Cell; 1.4 Electrochemical Reactions in the Silicon System 1.4.1 Four-Electron Electrochemical Oxidation of Silicon1.4.2 Two-Electron Electrochemical Oxidation of Silicon; 1.4.3 Electropolishing; 1.5 Density, Porosity, and Pore Size Definitions; 1.6 Mechanisms of Electrochemical Dissolution and Pore Formation; 1.6.1 Chemical Factors Controlling the Electrochemical Etch; 1.6.2 Crystal Face Selectivity; 1.6.3 Physical Factors Controlling the Electrochemical Etch; 1.7 Resume of the Properties of Crystalline Silicon; 1.7.1 Orientation; 1.7.2 Band Structure; 1.7.3 Electrons and Holes; 1.7.4 Photoexcitation of Semiconductors; 1.7.5 Dopants 1.7.6 Conductivity1.7.7 Evolution of Energy Bands upon Immersion in an Electrolyte; 1.7.8 Charge Transport at p-Type Si Liquid Junctions; 1.7.9 Idealized Current-Voltage Curve at p-Type Liquid Junctions; 1.7.10 Energetics at n-Type Si Liquid Junctions; 1.7.11 Idealized

Current-Voltage Curve at n-type Liquid Junctions; 1.8 Choosing, Characterizing, and Preparing a Silicon Wafer; 1.8.1 Measurement of Wafer Resistivity; 1.8.2 Cleaving a Silicon Wafer; 1.8.3 Determination of Carrier Type by the Hot-Probe Method; 1.8.4 Ohmic Contacts; 1.8.4.1 Making an Ohmic Contact by Metal Evaporation; 1.8.4.2 Making an Ohmic Contact by Mechanical Abrasion; References; 2: Preparation of Micro-, Meso-, and Macro-Porous Silicon Layers; 2.1 Etch Cell: Materials and Construction; 2.2 Power Supply; 2.3 Other Supplies; 2.4 Safety Precautions and Handling of Waste; 2.5 Preparing HF Electrolyte Solutions; 2.6 Cleaning Wafers Prior to Etching; 2.6.1 No Precleaning; 2.6.2 Ultrasonic Cleaning; 2.6.3 RCA Cleaning; 2.6.4 Removal of a Sacrificial Porous Layer with Strong Base; 2.7 Preparation of Microporous Silicon from a p-Type Wafer; 2.8 Preparation of Mesoporous Silicon from a p++-Type Wafer; 2.9 Preparation of Macroporous, Luminescent Porous Silicon from an n-Type Wafer (Frontside Illumination); 2.9.1 Power Supply Limitations; 2.10 Preparation of Macroporous, Luminescent Porous Silicon from an n-Type Wafer (Back Side Illumination); 2.11 Preparation of Porous Silicon by Stain Etching; 2.12 Preparation of Silicon Nanowire Arrays by Metal-Assisted Etching; References; 3: Preparation of Spatially Modulated Porous Silicon Layers; 3.1 Time-Programmable Current Source; 3.1.1 Time Resolution Issues; 3.1.2 Etching with an Analog Source; 3.1.3 Etching with a Digital Source; 3.2 Pore Modulation in the z-Direction: Double Layer

Sommario/riassunto

By means of electrochemical treatment, crystalline silicon can be permeated with tiny, nanostructured pores that entirely change the characteristics and properties of the material. One prominent example of this can be seen in the interaction of porous silicon with living cells, which can be totally unwilling to settle on smooth silicon surfaces but readily adhere to porous silicon, giving rise to great hopes for such future applications as programmable drug delivery or advanced, brain-controlled prosthetics. Porous silicon research is active in the fields of sensors, tissue engineering