Porous Silicon in Practice. Preparation, Characterization and Applications

Description: 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, medical therapeutics and diagnostics, photovoltaics, rechargeable batteries, energetic materials, photonics, and MEMS (Micro Electro Mechanical Systems).

Written by an outstanding, well-recognized expert in the field, this book provides detailed, step-by-step instructions to prepare and characterize the major types of porous silicon. It is intended for those new to the field. Sampling of topics covered:
- Principles of Etching Porous Silicon
- Etch Cell Construction and Considerations
- Photonic Crystals, Microcavities, and Bragg Stacks Etched in Silicon
- Preparation of Free-standing Films and Particles of Porous Silicon
- Preparation of Photoluminescent Nanoparticles from Porous Silicon
- Preparation of Silicon Nanowires by Electrochemical Etch of Silicon
- Surface Modification Chemistry and Biochemistry
- Measurement of Optical Properties
- Measurement of Pore Size, Porosity, Thickness, Surface Area

The whole is backed by a generous use of color photographs to illustrate the described procedures in detail, plus a bibliography of further literature pertinent to a wide range of application fields. For materials scientists, chemists, physicists, optical physicists, biomaterials scientists, neurobiologists, bioengineers, and graduate students in those fields, as well as those working in the semiconductor industry.

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