Hydrogenated Amorphous Silicon

Reviewing **Hydrogenated Amorphous Silicon**: Unlocking the Spellbinding Force of Linguistics

In a fast-paced world fueled by information and interconnectivity, the spellbinding force of linguistics has acquired newfound prominence. Its capacity to evoke emotions, stimulate contemplation, and stimulate metamorphosis is really astonishing. Within the pages of "**Hydrogenated Amorphous Silicon**," an enthralling opus penned by a very acclaimed wordsmith, readers embark on an immersive expedition to unravel the intricate significance of language and its indelible imprint on our lives. Throughout this assessment, we shall delve to the book is central motifs, appraise its distinctive narrative style, and gauge its overarching influence on the minds of its readers.

Amorphous Silicon and Related Materials H Fritzsche 1989-01-01 This book presents the most recent important ideas and developments in the field of Hydrogenated Amorphous Silicon and related materials. Each contribution is authored by an outstanding expert in that particular area. Contents:Structural Aspects:Structural Heterogeneities in Device-Quality Amorphous Hydrogenated Semiconductors (J A Reimer & M A Petrich)Local Structure of Dopants in Hydrogenated Amorphous Silicon (J B Boyce & S E Ready)Plasma Deposition of Amorphous and Crystalline Silicon: The Effect of Hydrogen on the Growth, Structure Electronic Properties (C C Tsai)Defects and Defect Dynamics:Thermal Equilibrium Effects in Doped Hydro-genated Amorphous Silicon (J Kakalios & R A Street)Kinetics of Carrier-Induced Metastable Defect Formation in Hydrogen Amorphous Silicon (W B Jackson & J Kakalios)Transient Photocapacitance Studies of Deep Defect Transitions in Hydrogenated Amorphous Silicon (J D Cohen & A V Gelatos)The Microscopic Structure of Defects in a-Si:H and Related Materials (M Stutzmann & D K Biegelsen)Electronic Transport, Trapping and Recombination:Transport and Tail State Interactions in Amorphous Silicon (W E Spear)Recombination in a-Si:H — Temperature and Field Quenching of the Photoluminescence (W Fuhs & K Jahn)Photo-luminescence in a-Si:H Films and Multilayers (W-C Wang & H Fritzsche)Amorphous Si-Ge Alloys:Optoelectronic Properties and the Gap State Distribution in a-Si, Ge Alloys (S Aljishi et al.)Multilayers and Interfaces:Differential Absorption Spectroscopy on Amorphous Silicon Quantum Well Structures (K Hattori et al.)Growth and Structure of Interfaces in a-Si:H/a-SiOx and a-Si:H/a-SiNx:H Multilayers and Heterojunctions (L Yang & B Abeles)and others Readership: Solid state physicists and electrical engineers.

Hydrogenated Amorphous Silicon R. A. Street 1991-08-30 Describes the properties and semiconductor device applications of hydrogenated amorphous silicon. A Materials Science book.

Hydrogenated Amorphous Silicon Alloy Deposition Processes Werner Luft 1993-05-24 This reference reviews common film and plasma diagnostic techniques and the deposition and film properties of various hydrogenated amorphous silicon alloys (a-Si:H).;Drawing heavily from studies on a-Si:H solar cells and offering valuable insights into other semiconductor applications of a-Si:H and related alloys, Hydrogenated Amorphous Silicon Alloy Deposition Processes: describes conventional as well as alternative, deposition processes and compares the resulting material properties; systematically categorizes various a-Si:H deposition techniques; details the characteristics of a-Si:H and related alloys with both high and low optical bandgap, including a-SiC:H, a-SiGe:H, and a-SiSn:H; discusses basic designs of glow discharge deposition reactors; evaluates the etching properties of amorphous silicon-based alloys; and examines microcrystalline silicon and silicon carbide.;Providing over 825 literature citations for further study, Hydrogenated Amorphous Silicon Alloy Deposition Processes is an incomparable resource for physicists; materials scientists; chemical, process and production engineers; electrical engineers and technicians in the semiconductor industry; and upper-level undergraduate and graduate students in these disciplines.

High Performance Hydrogenated Amorphous Silicon Thin-film Transistor Structure Chun-Ying Chen 1997

Hydrogenated Amorphous Silicon Jacques I. Pankove 1984

Hydrogenated Amorphous Silicon Cas Maessen 1988

Semiconductors and Semimetals Jacques I. Pankove 1984

Metastability and Long-range Disorder in Hydrogenated Amorphous Silicon David Hugh Quicker 1998

Growth Related Material Properties of Hydrogenated Amorphous Silicon Arno Hendrikus Marie Smets 2002 The realization of ultra high hydrogenated amorphous silicon (a-Si:H) growth rates (>10 A/s) is one of the main issues affecting cost reduction in the production process of thin film a-Si:H solar cells. Until now, the expanding thermal plasma (ETP) deposition technique and the hot-wire chemical deposition (HWCVD) technique are the only two techniques which have obtained good materials properties at ultra high growth rates of 100 A/s. To optimize the a-Si:H growth rate and the material properties, more insight into the a-Si:H growth is required. In this thesis the a-Si:H film properties deposited by means of the ETP technique are studied. Furthermore, the relation of the material properties with a-Si:H growth from the remote ETP deposition is studied.

Optical Properties and Transport Properties of Hydrogenated Amorphous Silicon Johannes Cornelis van den Heuvel 1989

Preparation and Characterization of Hydrogenated Amorphous Silicon James Jackson Sluss 1986

Semiconductors and Semimetals Robert K. Willardson 1984-10

HYDROGENATED Amorphous Silicon 1985

Amorphous Silicon Semiconductors--pure and Hydrogenated 1987

Optical Modeling and Characterization of Hydrogenated Amorphous Silicon Solar Cells Guoqiao Tao 1994

The Physics of Hydrogenated Amorphous Silicon II J.D. Joannopoulos 1984-03-01 With contributions by numerous experts

Hydrogenated Amorphous Silicon R. A. Street 1991-08-30 Divided roughly into two parts, the book describes the physical properties and device applications of hydrogenated amorphous silicon. The first section is concerned with the atomic and electronic structure, and covers growth defects and doping and defect reactions. The emphasis is on the optical and electronic properties that result from the disordered structure. The second part of the book describes electronic conduction, recombination, interfaces, and multilayers. The special attribute of a-Si:H which makes it useful is the ability to deposit the material inexpensively over large areas, while retaining good semiconducting properties, and the final chapter discusses various applications and devices.

Deposition of Hydrogenated Amorphous Silicon with the Hot Wire Technique Edith C. Molenbroek 1995

Optical Properties of Hydrogenated Amorphous Silicon William J. Gambogi 1984

Hydrogenated Amorphous Silicon D. E. Carlson 1984

Semiconductors and Semimetals 1984

Device Physics of Hydrogenated Amorphous Silicon Solar Cells Jianjun Liang 2008 This paper discusses the device physics of as-deposited and light-soaked hydrogenated amorphous silicon solar cells. The staebler-Wronski effect is the key issue in this paper. The metastability of a-Si: H solar cell is explained by a modified hydrogen collision model to explain the degradation of a-Si: H after some time light soaking. The key parameters are studied by experiments as well as computer simulation, both reach the agreement for our theory. Valence band tail model is used for our theory and simulation. For light soaked state, a defect is used for modeling.

The Physics of Hydrogenated Amorphous Silicon John D. Joannopoulos 1984

Hydrogenated Amorphous Silicon Emitter and Back-Surface-Field Contacts for Crystalline Silicon Solar Cells M. R. Page 2005 Thin hydrogenated amorphous silicon (a-Si:H) layers deposited by hot-wire chemical vapor deposition (HWCVD) are investigated as emitters and back-surface-field (BSF) contacts to make silicon heterojunction solar cells on p-type crystalline silicon wafers. A common requirement for excellent emitter and BSF quality is minimization of interface recombination. Best results require immediate a Si:H deposition and an abrupt and flat interface to the c-Si substrate. We obtain record 16.9% and 14.8% efficiencies on p-type planar float-zone (FZ) and Czochralski (CZ) silicon substrates, respectively, with HWCVD a-Si:H(n) emitters and Al-BSF contacts. Initial efforts with p-type HWCVD Si thin films as the BSF have yielded 12.5% efficiency on p type CZ-Si.

HYDROGENATED Amorphous Silicon 1985

The Physics of Hydrogenated Amorphous Silicon John D. Joannopoulos 1984

Glow-Discharge Hydrogenated Amorphous Silicon K. Tanaka 1989-11-30 A graduate-level description of recent Japanese research on the chemistry of amorphous silicon film deposition associated with plasma CVD, a step in producing amorphous semiconductors. Reports on studies (of microscopic processes of gas-phase reaction as well as chemical reactions on the film growin

A Real Time Study of Hydrogenated Amorphous Silicon, Microcrystalline Silicon, and Amorphous Silicon Carbide Growth by Optically Enhanced Infrared Reflectance Spectroscopy Monica Katiyar 1994 A new, optically enhanced reflection infrared spectroscopy technique is presented to study thin film growth in real time. Here, real time means under actual processing conditions, with a short data acquisition time compared to film changes or growth rates. This technique has industrial application in monitoring and controlling processes which involve a large or complex parameter space. These include interface control and the fundamentals of crystal growth, plasma deposition, and etching. These applications are illustrated in the thesis by studying the deposition of hydrogenated amorphous silicon (a-Si:H), microcrystalline silicon (muc-Si:H), and hydrogenated amorphous silicon carbide $rm (a-Sisb{1-x}Csb{x}$:H) thin films by reactive magnetron sputtering. Complimentary information about the film microstructure is obtained from real time spectroscopic ellipsometry measurements. For a-Si:H growth, we present the first detailed and quantitative set of experimental data on hydrogen incorporation and release processes. The absorption due to the stretching modes of Si-H bonds (1800-2300 cm$sp{-1}$) is used to quantify the increase or loss of H during film growth. A narrow component at sim2100 cm$sp{-1}$ corresponding to all SiH$sb{rm X}$ bonds on the physical surface is identified for the first time; the line width of this mode is used to distinguish signals from the bulk and the surface. Various combinations of growth flux (isotope labelling, hydrogen partial pressure between 0.1 and 2.0 mTorr) and substrate material (on SiO$sb2$, a-Si, or a-Si:D) at substrate temperatures between 120 to 350$spcirc$C are used to quantify surface hydrogen coverage, hydrogen implantation, and H removal from surface and sub-surface. We analyze the growth of muc-Si:H on SiO$sb2$ substrate; no evidence of etching during muc-Si deposition is found. We also study the phase transformation of amorphous to microcrystalline silicon when an a-Si film is exposed to a pure H$sb2$ plasma. The a-Si is first heavily hydrogenated and then transforms to muc-Si with a concomitant decrease in H content. During a-Si$rmsb{1-x}$C$rmsb{x}$:H growth, a transition layer rich in hydrogen and carbon is observed between the film and the substrate; steady state growth is not achieved until $>$250 on A SiO$sb2$, and sim70 A on a-Si:H substrates.

Hydrogenated Amorphous Silicon Solar Cells Deposited from Silane Diluted with Hydrogen Gijs van Elzakker 2010

The Physics of Hydrogenated Amorphous Silicon I J.D. Joannopoulos 2014-08-23 With contributions by numerous experts

The Physics of Hydrogenated Amorphous Silicon II J.D. Joannopoulos 2008-02-29 With contributions by numerous experts

Hydrogenated Amorphous Silicon R. A. Street 2005-09-08 Divided roughly into two parts, the book describes the physical properties and device applications of hydrogenated amorphous silicon. The first section is concerned with the atomic and electronic structure, and covers growth defects and doping and defect reactions. The emphasis is on the optical and electronic properties that result from the disordered structure. The second part of the book describes electronic conduction, recombination, interfaces, and multilayers. The special attribute of a-Si:H which makes it useful is the ability to deposit the material inexpensively over large areas, while retaining good semiconducting properties, and the final chapter discusses various applications and devices.

The Physics of Hydrogenated Amorphous Silicon: Structure, preparation, and devices John D. Joannopoulos 1984

Hydrogenated Amorphous Silicon: Electronic and transport properties 1984

Semiconductors and Semimetals Robert K. Willardson 1984-08

Hydrogenated Amorphous Silicon 1984

Studies of Hydrogenated Amorphous Silicon Stephen G. Bishop 1984 This report discusses the results of probing the defect structure and bonding of hydrogenated amorphous silicon films using both nuclear magnetic resonance (NMR) and electron spin resonance (ESR). The doping efficiency of boron in a-Si:H was found to be less than 1%, with 90% of the boron in a threefold coordinated state. On the other hand, phosphorus NMR chemical shift measurements yielded a ratio of threefold to fourfold P sites of roughly 4 to 1. Various resonance lines were observed in heavily boron- and phosphorus-doped films and a-SiC:H alloys. These lines were attributed to band tail states on twofold coordinated silicon. In a-SiC:H films, a strong resonance was attributed to dangling bonds on carbon atoms. ESR measurements on low-pressure chemical-vapor-deposited (LPCVD) a-Si:H were performed on samples. Microcrystalline silicon samples were also examined. The phosphorus-doped films showed a strong signal from the crystalline material and no resonance from the amorphous matrix. This shows that phosphorus is incorporated in the crystals and is active as a dopant. No signal was recorded from the boron-doped films.

Amorphous and Microcrystalline Silicon Solar Cells: Modeling, Materials and Device Technology Ruud E.I. Schropp 2016-07-18 Amorphous silicon solar cell technology has evolved considerably since the first amorphous silicon solar cells were made at RCA Laboratories in 1974. Scien tists working in a number of laboratories worldwide have developed improved alloys based on hydrogenated amorphous silicon and microcrystalline silicon. Other scientists have developed new methods for growing these thin films while yet others have developed new photovoltaic (PV) device structures with im proved conversion efficiencies. In the last two years, several companies have constructed multi-megawatt manufacturing plants that can produce large-area, multijunction amorphous silicon PV modules. A growing number of people be lieve that thin-film photovoltaics will be integrated into buildings on a large scale in the next few decades and will be able to make a major contribution to the world's energy needs. In this book, Ruud E. I. Schropp and Miro Zeman provide an authoritative overview of the current status of thin film solar cells based on amorphous and microcrystalline silicon. They review the significant developments that have occurred during the evolution of the technology and also discuss the most im portant recent innovations in the deposition of the materials, the understanding of the physics, and the fabrication and modeling of the devices.

Recombination and Transport in Hydrogenated Amorphous Silicon Seung-Ho Yi 1996

Characterization of Hydrogenated Amorphous Silicon Using the Constant Photocurrent Method Jin Miao Shen 1992