**G. Eftekharis** scientific contributions while affiliated with **State University of New York at New Paltz (New Paltz, United States)** and other places

Publications (58), Publications citing this author (308)

- **Article: The anodization of InP**

  **Abstract:** InP (n type) was anodized under constant-voltage conditions using a reacted boric acid-ethylene glycol electrolyte. The results which were obtained can be explained in terms of a dissolution reaction which occurs as the phosphorus ions diffuse towards the oxide-electrolyte interface. This model also accounts for many of the InP anodization results which have been previously published.

  Article · May 1982 · Thin Solid Films

- **Article: Electrical conduction through anodic oxides on InP**

  **Abstract:** The results of measurements of ac and dc electrical properties in anodic oxides on n-type indium phosphide are reported. The dc current, which is polarity dependent, appears to be due to Schottky emission. The semiconductor surface is inverted at zero bias with a potential of −0.9 V. An oxide and surface states charge density of 2.2 × 10¹¹ electrons cm⁻² is measured. The oxide relative permittivity decreases from 14.8 at 400 Hz to 4.5 at 106 Hz and the ac conductivity has a sublinear...

  Article · Mar 1983 · physica status solidi (a)

- **Article: Electrical Degradation of InP Schottky Barriers Due to Mercury Contamination**
G. Eftekhari

**Abstract:** Mercury is often used as a non-destructive probe to measure electrical characteristics of semiconductors. It is also used as a gate metal in MOSFETs and as a metal contact for Schottky barrier formation. In this study an attempt has been made to characterize the electrical degradation of InP wafers due to mercury contamination. Contaminated diodes had for 1 min and 10 min, showed an ideality factor of 1.4 and 1.8, respectively. The barrier height also increased in the contaminated diodes.

Article · Aug 1990 · physica status solidi (a)

- Article: *Effect of rapid thermal annealing on anodic oxides on InP*

G. Eftekhari

**Abstract:** The effect of rapid thermal annealing on anodic oxides on InP is investigated. The results of measurements show that dc resistivity increases. Dc current conduction mechanism switches from Schottky emission to Pool-Frenkel emission. The flat band voltage shift changes causing the surface of InP to change from an inversion to a depletion layer. The permittivity and especially ac conductivity vary with annealing temperature. The ac conductivity shows a sublinear frequency dependence.

Article · Sep 1990 · physica status solidi (a)

- Article: *Characterization of Rapidly Thermally Annealed GaAs and InP Surfaces Using Schottky Barriers*

G. Eftekhari

**Abstract:** The characteristics of Au contacts on rapid thermal annealed GaAs and InP are examined. It was found that for annealing parameters less than 850 °C and 20 s surface damage is minimal. The diodes fabricated on GaAs and InP annealed at high temperatures and for longer periods of time show increases in reverse current and ideality factor. This had the effect of lowering the Q value of the diodes.

Article · Dec 1990 · physica status solidi (a)
**Abstract:** TaSi2GaAs diodes were studied at different rates of deposition of tantalum silicide. A minimum ideality factor of 1.03 was observed at a deposition rate of 4 Å s⁻¹. At this rate the barrier height was determined to be 0.72 eV using the experimental value of the Richardson constant of 2 A cm⁻² K⁻². High temperature annealing of the contacts was performed in a heat pulse unit using the proximity technique. This technique eliminates the need for encapsulation of the semiconductor. The stability... Show More

**Article · Feb 1991 · Thin Solid Films**

**G. Eftekhar**

**Abstract:** The electrical characteristics of samarium-p-type silicon contacts have been studied after rapid thermal annealing for 20 s. Tungsten was deposited on samarium without breaking vacuum to prevent the oxidation of samarium. Stable Schottky contacts with a barrier height of 0.73 eV have been obtained after annealing between 300°C and 600°C. The ideality factor showed considerable improvement with annealing.

**Article · Apr 1991 · Thin Solid Films**

**G. Eftekhar**

**Abstract:** It is found that rapid thermal annealing of thin oxide/GaAs increases the barrier height of contacts made on these surfaces. The increase of barrier height is related to charge introduced to the oxide layer. The reverse current increases for annealing temperatures higher than 600 °C. On a découvert que le recuit thermal rapide des oxides/GaAs peu épais augmente la hauteur limite (barrier height) des contacts faits sur ces surfaces. L’augmentation de la hauteur limite est apparenté à la charge... Show More

**Article · Feb 1991 · Thin Solid Films**

**G. Eftekhar**

**Abstract:** The electrical characteristics of samarium-p-type silicon contacts have been studied after rapid thermal annealing for 20 s. Tungsten was deposited on samarium without breaking vacuum to prevent the oxidation of samarium. Stable Schottky contacts with a barrier height of 0.73 eV have been obtained after annealing between 300°C and 600°C. The ideality factor showed considerable improvement with annealing.

**Article · Apr 1991 · Thin Solid Films**

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**Article · Feb 1991 · Thin Solid Films**
Article · Oct 1991 · physica status solidi (a)

- **Article**: Effect of Rapid Thermal Annealing on Electron Trapping in Thin Oxide on n-Type GaAs

Ghader Eftekhari

**Abstract**: Electron trapping in the thin oxide layer of Al and Ta-n-type GaAs metal-insulator semiconductor (MIS) structure was studied using the flat-band voltage shift. Three trap sites for the Al contact and two for the Ta contact were obtained. The rapid thermal annealing of oxide caused changes in trap characteristics and elimination of one trap site in the Al contact.


- **Article**: Effect of Deionized Water Rinses on Leakage Current of Thin Gate Oxides Grown by Rapid Thermal Oxidation of Si

G. Eftekhari

Article · Jan 1993 · physica status solidi (a)

- **Article**: Characterization of Thin SiO_2 Grown by Rapid Thermal Processing as Influenced by Processing Parameters

G. Eftekhari

**Abstract**: Significant changes in the electrical characteristics of thin SiO_2 grown by rapid thermal processing were obtained as the processing parameters were changed. The low leakage current corresponding to high barrier height was obtained at the growth temperature of 1000-degrees-C. The fixed charge density and breakdown voltage decreased as the growth temperature increased. Rapid thermal annealing at 1000-degrees-C improved the leakage current. Also, rapid thermal annealing improved the breakdown...

Article · Mar 1993 · Journal of The Electrochemical Society
**Article: Thermal Stability of Rapidly Annealed Ruthenium n-GaAs Schottky Contacts**

Ghader Eftekhari

**Abstract:** In this paper the thermal stability of ruthenium n-GaAs is reported. The annealing time was 15 s and annealing temperature was varied in the range 200-800°C. The contacts were found stable for annealing temperature up to about 750°C. For temperatures above 750°C a sharp decrease in barrier height (i.e. degradation) was observed. Also the ideality factor and reverse current showed sharp increase. This is considered as result of chemical reactions at the interface. The removal of native oxide... Show More

Article · May 1993 · Japanese Journal of Applied Physics

**Article: Electron trapping in thin oxide on n-InP**

G. Eftekhari

**Abstract:** Electron trapping in anodized thin oxide on InP was studied using the flatband voltage method. Aluminum and gold were used as the contact metal. Three trap sites for aluminum contact and two trap sites for gold contact were obtained. Rapid thermal annealing (500Â°C, 30 s) of oxide before metal evaporation caused reduction in trap density and capture cross section. Similar annealing of oxide after metal evaporation resulted in similar information except a new trap site is generated in the... Show More

Article · Jul 1993 · Journal of Vacuum Science & Technology B Microelectronics and Nanometer Structures

**Article: Characterization of trap sites in thin oxide on sulfur-passivated InP**

G. Eftekhari

Article · Jul 1993 · physica status solidi (a)

**Article: Effect of rapid thermal annealing on the barrier height of metal-GaAs with selenium interfacial layer**
Variation in the effective Richardson constant of metal—GaAs and Metal—InP contacts due to the effect of processing parameters

Abstract: The value of experimental Richardson constant (A*) is found to be a function of metal film thickness, type of the metal, method of deposition, and condition of semiconductor prior to metal deposition. In the case of Al and W on GaAs, the value of A* is found higher than the theoretical value. However, as the film thickness increases, the value of A* decreases. The larger value of A* is related to electrically active defects at the interface produced during sputtering. Filament evaporation...

Electrical Conduction Through Anodic Oxides on Sulfur Passivated InP

Abstract: The electrical characteristics of anodic oxides on sulfur-passivated InP were investigated. The effects of passivation of InP and subsequent rapid thermal annealing on the oxide included reduction in the fixed charge density, and increases in both breakdown voltage and resistivity. The permittivity and conductivity of the oxide were also influenced by the passivation. A model based on the changes in the structure of the oxide is proposed to explain the results. According to this model, a...

Characterization of trap sites in thin oxide on selenium-passivated GaAs

Abstract: The electron trapping in thin oxide on selenium passivated gallium arsenide was studied. It was observed that the selenium treatment of GaAs causes the elimination of a trap site with small capture cross section and reduction in the trap
density. Reduction in the reverse current of metal-thin oxide-selenium treated GaAs diodes is attributed to the improvements in trap characteristics.

Article · Feb 1994 · physica status solidi (a)

- Article: **Rapid thermal stability of refractory metal and silicide contacts on p-InP**

  G. Eftekhari

  **Abstract:** The rapid thermal stability of Ti, Ta, TiSi2, and TaSi2 contacts on p-InP is investigated. The annealing temperature varies in the range 700 to 900°C and the annealing time is 10 s. The TiSi2 and TaSi2 contacts show superior stability compared with the Ti and Ta contacts. The TaSi2 contacts are found more stable than the TiSi2 contacts. A defect model is used to explain the observations.

  Article · Jun 1994 · physica status solidi (a)

- Article: **The electrical properties of sulfur-passivated and rapidly thermally annealed GaAs metal-oxide-semiconductor structures with the oxide layer grown anodically**

  G. Eftekhari

  **Abstract:** The effects of rapid thermal annealing (RTA) and sulfur passivation of GaAs on the electrical properties of GaAs metal-oxide-semiconductor (MOS) structures were investigated. The oxide layers were grown by anodization. Annealing was performed after oxidation and before aluminum evaporation. Passivation improved the electrical properties. Further improvements were obtained after RTA. The MOS structures on passivated GaAs showed good thermal stability compared with those on unpassivated GaAs. Show More

  Article · Aug 1994 · Thin Solid Films

- Article: **The Influence of Oxidation Temperature and Gate Metal on the Electrical Properties of InP Metal-Insulator-Semiconductor Tunnel Diodes**

  Ghader Eftekhari

  **Abstract:** The electrical properties of InP metal-insulator-semiconductor (MIS) diodes with a thermally grown oxide interfacial layer were investigated. The oxidation temperatures were 400°
C, 450° C and 500° C, and gate metals were Al, Au, Cu, and Pt. Diodes with interfacial layers grown at 450° C showed better characteristics. The parameters under investigation were barrier height, ideality factor and interface state density. Diodes with interfacial layers grown at 500° C had poor characteristics.

Article · Nov 1994 · Japanese Journal of Applied Physics

- Article: Effects of sulfur passivation and rapid thermal annealing on the electrical properties of InP metal–insulator semiconductor Schottky diodes

G. Eftekhari

Abstract: The effects of sulfur passivation and rapid thermal annealing on the electrical characteristics of InP metal–insulator semiconductor Schottky diodes are investigated. Passivation causes a moderate increase in barrier height and decrease in reverse current. Further reduction in the reverse current is obtained after rapid thermal annealing. The passivated diodes show a very good thermal stability. Bond formation at the interface and charge injection into the oxide are used to explain the... Show More

Article · Dec 1994 · Journal of vacuum science & technology. B, Microelectronics and nanometer structures: processing, measurement, and phenomena: an official journal of the American Vacuum Society

- Article: MIS diodes on n-InP with tantalum oxide interfacial layer grown by rapid thermal oxidation of tantalum

G. Eftekhari

Abstract: The electrical properties of MIS InP diodes where the interfacial layer is prepared by electron beam evaporation of Ta and subsequent rapid thermal oxidation of evaporated Ta film are studied. Ta and Al are used as the gate metals. Compared with the case of no interfacial film between metal and InP, the barrier height increases by 0.22 and 0.12 eV for Ta and Al gate metals, respectively. The MIS diode with Ta gate metal shows good thermal stability. In the case of Al gate metal the thermal... Show More

Article · Dec 1994 · physica status solidi (a)

- Article: Influence of rapid thermal annealing on the electrical characteristics of GaAs metal-oxide-semiconductor structures with a double oxide layer
G. Eftekhari

Abstract: The electrical characteristics of double-oxide metal-oxide-semiconductor (MOS) structures on n-GaAs have been studied. The oxide layers were anodic and sputtered SiO2. The parameters analyzed were current conduction mechanism, resistivity, breakdown electric field, capacitance-voltage relationships and oxide fixed charges. Overall, the quality of this structure was inferior compared with the all-anodic oxide MOS structures. However, the parameters of the double-oxide MOS structure were... Show More

Article · Feb 1995 · Thin Solid Films

- Article: Electron trapping in thin oxide on GaAs and InP at 77 K

G. Eftekhari

Abstract: Electron trapping in thin anodized layers on GaAs and InP at 77 K was studied using the flat band voltage shift method. Compared with the trap characteristics at room temperature, the capture cross section and density were increased. The trap sites with very small capture cross section at room temperature were not detected at 77 K. A few trap sites were detected at 77 K which possibly act as shallow levels at room temperature. For both GaAs and InP diodes, trap characteristics were found to... Show More

Article · Mar 1995 · Journal of Vacuum Science & Technology B Microelectronics and Nanometer Structures

- Article: Comparison of the electrical characteristics of Si metal–insulator–semiconductor tunnel diodes with interfacial layer grown by rapid thermal oxidation of Si in O2 and in N2O

G. Eftekhari

Abstract: The electrical properties of Si metal–insulator–semiconductor tunnel diodes with the interfacial layer grown by rapid thermal oxidation in oxygen [case (a)] and in N 2 O [case (b)] were analyzed. The interface state density in case (b) was found lower than that in case (a) by a factor of 4. The reverse current in case (b) was decreased by more than an order of magnitude. The interface state density is further reduced after high-temperature annealing. Diodes in case (b) showed better thermal... Show More

Article · Apr 1995 · Journal of vacuum science & technology. B, Microelectronics and nanometer structures: processing, measurement, and phenomena: an official journal of the American Vacuum Society
Ghader Eftekhari

Abstract: The effects of rapid thermal annealing 1-100 s on the electrical characteristics of Ni and Pd contacts on n-GaAs are studied. At annealing temperature (T_a) of 300° C and 450° C the contacts remained quite stable. At annealing temperature of 600° C the contacts showed sign of degradation if they are annealed for more than 40 s. Degradation in Pd contacts was more pronounced than in Ni contacts. Consumption of GaAs and formation of different reactions at the interface, resulting in a layer... Show More

Article · May 1995 · Japanese Journal of Applied Physics

G. Eftekhari

Abstract: The effect of rapid thermal annealing on ITO/p-InP heterostructures was examined. In the as-deposited contacts the current conduction is dominated by recombination at low bias and by thermionic emission at high bias. Current in contacts annealed at 500 degrees C was dominated by thermionic emission for all values of bias. Annealing at 700 degrees C for 20 s caused the current conduction to be governed by tunnelling. This is explained as the result of diffusion of indium and tin atoms into... Show More

Article · May 1995 · Semiconductor Science and Technology

G. Eftekhari

Abstract: The effects of rapid thermal annealing on the electrical properties of ITO/n-GaAs are investigated. For as-deposited contacts the current is dominated by recombination at low bias and by thermionic emission at high bias. Annealing at 500 °C for 20 s causes the current to be dominated by thermionic emission for all biases. Annealing at 600 and 700 °C degrades the contact properties. At 700 °C annealing temperature the current is dominated by tunneling. Removal of sputter generated defects at... Show More

• Article: Electrical characteristics of metal/n-InSb contacts with InSb annealed rapidly prior to metal evaporation

G. Eftekhari

Abstract: It has been reported that rapid thermal annealing of implanted (Be and Si) InSb at a temperature range of 300–450 °C for 20 s is sufficient to activate the implanted dopants. To investigate the effect of such annealing on the unimplanted parts of InSb, the electrical properties of Al and Ag/n-InSb in which InSb is rapidly annealed (using proximity method) prior to Al and Ag evaporation are analyzed. It was determined that annealing at 300 and 350 °C does not degrade contact properties. The...

Article · Sep 1995 · Journal of vacuum science & technology. B, Microelectronics and nanometer structures: processing, measurement, and phenomena: an official journal of the American Vacuum Society

• Article: Electrical conduction in rapidly annealed sputter-deposited SiO2 films (in O2 Ar atmosphere) on Si

G. Eftekhari

Abstract: The poor quality of argon-sputtered SiO2 is attributed to oxygen vacancies in the bulk of the oxide. Introducing oxygen atoms into the oxide during sputtering improves its quality. Further improvement can be obtained after rapid thermal annealing at high temperature. The barrier height (φ), breakdown electric field (Eb), and stability of oxygen-argon sputtered SiO2 after annealing is attributed to the formation of bonds between loose oxygen and silicon atoms at high temperature and therefore...

Article · Sep 1995 · physica status solidi (a)

• Article: The effect of rapid thermal annealing on the electrical characteristics of InP MOS structures with a double oxide layer

G. Eftekhari
Abstract: The electrical properties of double oxide layer InP MOS structures are analyzed. The first oxide layer (next to InP) is anodized and the second oxide layer is RF magnetron sputtered SiO2. The quality of as-deposited oxide structures is not good. However, it is improved after rapid thermal annealing. The resistivity and breakdown electric field increase. The current conduction process and InP surface potential change after annealing. The oxide fixed charge density also decreases after... Show More

Article · Dec 1995 · physica status solidi (a)

G. Eftekhari

Abstract: To increase the rate of oxidation of Si in N2O, oxygen was added to N2O. The effect of varying the percentage of N2O in the total gas on the quality of the oxide was examined. It was experimentally determined that for a percentage of N2O more than about 50, the quality of the oxide is comparable to the oxide grown using pure N2O. This may suggest that to improve the quality of thermal oxide on Si (especially its hardness against hot carriers) a certain level of nitrogen atoms is sufficient.... Show More

Article · Jan 1996 · Journal of Vacuum Science & Technology B Microelectronics and Nanometer Structures

Ghader Eftekhari

Abstract: It is demonstrated that sulfur passivation of GaSb before metal evaporation improves thermal stability of Al/n-GaSb Schottky contacts. The contacts were annealed at 300 degrees C, 400 degrees C, and 500 degrees C for 20 s. In the unpassivated contacts annealed at 500 degrees C barrier height decreased by 180 meV, reverse current increased by a factor of 10, breakdown voltage decreased by a factor of 2.6. In the passivated contacts annealed at 500 degrees C, barrier height decreased by 40... Show More

Article · Feb 1996 · Japanese Journal of Applied Physics

Ghader Eftekhari

Abstract: The influence of rapid thermal annealing and sulfur passivation on the electrical characteristics of anodically grown InSb MOS structures
G. Eftekhari

Abstract: The influence of rapid thermal annealing (RTA) and sulfur passivation of InSb on the electrical characteristics of InSb metal-oxide semiconductor (MOS) structures are studied. The parameters of interest are the current conduction mechanism, electric breakdown voltage and oxide fixed charges. This study shows that RTA for temperature up to 350 °C improves the electrical properties. For temperatures higher than 350 °C, electrical properties degrade. Passivation of InSb improves the thermal... Show More

Article · May 1996 · Thin Solid Films

- Article: Thermal stability of rapidly annealed CoSi2/n-GaAs and CoSi2/p-InP Schottky contacts

G. Eftekhari

Abstract: Thermal stability of rapidly annealed CoSi2/n-GaAs and CoSi2/p-InP contacts was studied. Annealing time was 10 s and the proximity method was used during annealing. Annealing at 700 and 800 °C made contacts more reliable, which is related to the removal of sputter created defects. Annealing at temperature higher than 900 °C caused significant degradation, which is attributed to the diffusion and reaction of elements at the interface. © 1996 American Vacuum Society

Article · Jul 1996 · Journal of Vacuum Science & Technology A Vacuum Surfaces and Films

- Article: Rapid Thermal Annealing Behavior of MoSi_{2}/p{-}Si Schottky Contacts Formed at Various Deposition Rates

Ghader Eftekhari

Abstract: The influence of deposition rate and rapid thermal annealing on the electrical properties of MoSi2/p-Si contacts were examined. It was experimentally determined that contacts formed at deposition rate of 0.6 nm/s have a better quality compared with the contacts formed at other deposition rates. Also, these contacts showed a better thermal stability than the contacts formed at other deposition rates. The formation of surface charges associated with defects and different grain sizes and their... Show More

Article · Jul 1996 · Japanese Journal of Applied Physics
• Article: Rh/n-GaAs contacts with and without sulfur passivation

G. Eftekhari

Abstract: The Rh/n-GaAs contacts with and without sulfur passivation were examined. It was demonstrated that passivation results in contacts of better quality and improved thermal stability. The passivated contacts had higher barrier height, lower reverse current, and lower ideality factor. The formation of thermally stable S–S, S–Ga, and S–As bonds at the GaAs surface, suppression of thermally generated defects, and possible modification in the charge and structure of native oxide were used to... Show More

Article · Nov 1996 · Journal of Vacuum Science & Technology B Microelectronics and Nanometer Structures

• Article: Electrical Properties of Sulfur Passivated MIS GaAs Diodes

G. Eftekhari

Abstract: The electrical properties and aging of sulfur passivated MIS GaAs diodes were studied. Comparison of sulfur and selenium passivated diodes shows that sulfur passivation is more effective than the selenium passivation.

Article · Feb 1997 · physica status solidi (a)

• Article: Stability of rapidly annealed reactive sputter deposited nitrided silicon dioxide

G. Eftekhari

Abstract: The effect of incorporation of nitrogen atoms into the structure of reactively sputtered SiO 2 was examined. It was determined that the presence of a controlled concentration of nitrogen atoms improves the electrical properties of the oxide. This could be achieved at partial pressure of nitrogen of about 10%. High temperature annealing improved the oxide properties. The nitrided oxides showed a better resistance to high current stress. © 1997 American Vacuum Society.
**Article: The Effect of Sulfur Passivation and Rapid Thermal Annealing on the Properties of InAs MOS Structures with the Oxide Layer Deposited by Reactive Sputtering**

G. Eftekhari

**Abstract:** The effect of rapid thermal annealing and sulfur passivation on the quality of reactively sputtered SiO2 on InAs were investigated. Results show that both rapid thermal processing and sulfur passivation cause a reduction in leakage current and oxide fixed charges. Annealing at temperature higher than 400 °C caused degradation. Also passivation started to loose its effectiveness when structures are annealed at 500 °C.

Article · Jun 1997 · physica status solidi (a)

**Conference Paper: Rapid thermal processing activity in teaching and research in the State University of New York at New Paltz**

G. Eftekhari

**Abstract:** The applications of rapid thermal processing in Teaching and Research at the State University of New York at New Paltz are explained. It is used by students in the microelectronic laboratory for oxidation, making ohmic contacts and annealing. In research it is used for oxidation, oxynitridation, study of thermal stability of metal-semiconductor contacts, metal-insulator-semiconductor tunnel diodes, and metal-oxide-semiconductor structures

Conference Paper · Aug 1997

**Article: Electrical characteristics of Ta2O5 films on Si prepared by dc magnetron reactive sputtering and annealed rapidly in N2O**

G. Eftekhari

**Abstract:** The electrical properties of reactive sputtered tantalum oxide annealed rapidly in N2O ambient improves the leakage current, increases dielectric constant and electric field breakdown. These improvements are the result of incorporation of oxygen into the structure of the oxide. This is simpler than the other methods of supplying oxygen into the oxide such as annealing in oxygen plasma. © 1998 American Vacuum Society.

• Article: **Rapid thermal annealing of reactive sputtered tantalum oxide films on GaAs in N2O atmosphere**

G. Eftekhari

**Abstract:** The electrical properties of composite oxide (anodized oxide and tantalum oxide deposited by reactive sputtering) on GaAs annealed in N2O were studied. The leakage current was decreased and at moderate electric field strengths it is governed by Schottky emission. The breakdown electric field of the samples and the dielectric constant of tantalum oxide were increased after annealing. © 1998 American Vacuum Society.

Article · Jul 1998 · Journal of Vacuum Science & Technology A Vacuum Surfaces and Films

• Article: **Electrical characteristics of selenium-treated GaAs MIS Schottky diodes**

G Eftekhari

**Abstract:** The author has investigated the effect of selenium treatment of GaAs on the metal-insulator-semiconductor (MIS) Schottky diode characteristics. The results show that the surface-state density and trap density at the interface decrease. This results in decrease in the barrier height and reverse current. The treated diodes showed little aging effect. These observations can be explained using the formation of arsenic selenium and selenium-selenium bonds at the surface and in the thin layer next... Show More

Article · Jan 1999 · Semiconductor Science and Technology

• Article: **Reactively sputtered titanium nitride Schottky contacts on n-GaAs and their thermal stability**

G Eftekhari

**Abstract:** The effects of partial pressure of nitrogen during reactive sputtering of and subsequent rapid thermal annealing on the quality of are analysed. Nitrogen partial pressure of 0.1 produces poor-quality contacts. Increasing the partial pressure of nitrogen to 0.3 improves the contact properties. Further increasing partial pressure of nitrogen to 0.4 causes a reduction of the barrier height while the other parameters remain almost unchanged. The possible under-stoichiometry in contacts made at a... Show More

Article · Jan 1999 · Semiconductor Science and Technology
• Article: Electrical characterization of rapidly annealed Ni and Pd/n-InP Schottky diodes

G Eftekhar

**Abstract:** The effects of rapid thermal annealing on the electrical characteristics of Ni and Pd contacts on n-InP are investigated. Results show that annealing at temperatures up to 450 degrees C and for durations up to 100 s has little effect on the electrical parameters of these contacts. Contacts annealed at 600 degrees C showed some degradation. Contacts annealed at 450 degrees C and 600 degrees C for 100 s showed an aging effect. Different reaction processes at the interface and formation of an...

Article · Jan 1999 · Semiconductor Science and Technology

• Article: Thermal stability of WNx/n-GaAs Schottky contacts formed by reactive sputtering

G Eftekhar

**Abstract:** The electrical properties and thermal stability of WNx/GaAs contacts where WNx is formed by reactive sputtering of W are investigated. The results show that contacts have good electrical properties and thermal stability provided that the partial pressure of nitrogen gas during sputtering does not exceed certain limits. Excess nitrogen in WNx film degrades contact properties. The formation of W and W2N phases, trapping of excess nitrogen atoms at the interface and the possible formation of...

Article · Jan 1999 · Semiconductor Science and Technology

• Article: Thermal stability of silicide contacts on GaAs using the proximity technique during rapid thermal annealing

G Eftekhar

**Abstract:** The proximity technique (face-to-face) has been used for annealing of WSi0.6 and TiSi2 contacts on GaAs. This technique eliminates the need for encapsulation of GaAs or As overpressure. The contacts were stable up to an annealing temperature of 900 degrees C with little degradation of electrical properties. The Richardson constant decreased sharply at high annealing temperature which may have been due to creation of defects at the interface.

Article · Jan 1999 · Semiconductor Science and Technology
• Article: Improvements in the electrical properties of indium oxide/p-InP and indium oxide/n-GaAs heterostructures formed at low reaction temperatures by rapid thermal annealing

G Eftekhari

**Abstract:** Recently it has been observed that indium oxide/p-InP and indium oxide/n-GaAs heterojunctions, where the indium oxide is prepared at lower reaction temperatures (<100 degrees C), have degraded electrical parameters. This has been attributed to the clustering of indium atoms at the interface. It is shown that rapid thermal annealing (600 degrees C, 20 s) improves electrical parameters of the contacts formed at lower reaction temperatures. The oxidation of GaAs and InP at lower reaction... Show More

Article · Jan 1999 · Semiconductor Science and Technology

• Article: Thermal Stability of Indium Tin Oxide/n-GaAs Heterostructures with and without Sulfur Passivation

G. Eftekhari

**Abstract:** Available from http://www3.interscience.wiley.com/cgi-bin/abstract/72507455/START

Article · Apr 2000 · physica status solidi (a)

• Article: Sulfur passivation of Ga2O3 (Gd2O3)/GaAs metal-oxide-semiconductor structures

G. Eftekhari

**Abstract:** The properties of Ga2O3 films evaporated on unpassivated and passivated GaAs surfaces using a Gd3Ga5O12 source were studied. The properties of unpassivated (passivated) films were a strong (weak) function of substrate temperature with best results obtained at a substrate temperature of about 100 °C. The thermal stability of films evaporated at a substrate temperature of 100 °C was studied as well. The passivated films showed a better thermal stability. The bonds formed at the surface layer... Show More

Article · Sep 2000 · Journal of Vacuum Science & Technology B Microelectronics and Nanometer Structures
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**Article: **The Al-(n-InP) Schottky barrier

B Tuck · G Eftekhari · D M de Cogan

**Abstract:** Schottky barriers have been prepared by the evaporation of aluminium on to bulk-grown n-type InP slices. Reproducible devices were obtained providing sufficient care was taken over the preparation of the semiconductor surface. Current-voltage, capacitance-voltage and photocurrent measurements were made on the diodes. The current measurements showed the ideality factor n, to be close to unity at room temperature and above, indicating that the main mechanism of current flow was thermionic...

Article · Nov 2000 · Journal of Physics D Applied Physics

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**Article: **Electrical properties of InP MIS devices

G Eftekhari · B Tuck · D de Cogan

**Abstract:** Thin film metal-insulator-semiconductor devices have been prepared on n-type InP substrates. The metal used was aluminium and the insulating oxide film was produced using an anodisation technique. Diodes were made with oxide thicknesses of 40 AA and 110 AA and were evaluated using current-voltage measurements over the temperature range 150-350K and also capacitance-voltage techniques. Both sets of measurements were compared with current metal-insulator-semiconductor theory and values were...

Article · Nov 2000 · Journal of Physics D Applied Physics

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**Article: **Electrical properties of sulfur-passivated III–V compound devices

G. Eftekhari

**Abstract:** The results of numerous studies since 1987 show that sulfur passivation improves the electrical parameters of III–V compound devices. In this article, we examine the electrical parameters of metal–semiconductor contacts (MS), MS contacts with thin interfacial layer (MIS), and metal-oxide–semiconductor structures (MOS).

Article · Sep 2002 · Vacuum

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