

Erschienenene Publikationen

Published Papers

(1) FTIR Study of Precipitation of Implanted Nitrogen in CZ-Si Annealed under High Hydrostatic Pressure

V.D. Akhmetov, A. Misiuk, H. Richter

Solid State Phenomena **108-109**, 157 (2005)

The evolution of nitrogen related infrared vibrational spectra of CZ-Si implanted with nitrogen, with doses 10^{17} ion/cm² and 10^{18} ion/cm², at 140 keV, was studied after annealing at 1130 °C/5h under different hydrostatic pressures, from 1 bar to 10.7 kbar. It was found for each pressure applied, that the increased nitrogen dose leads to transformation of broadband spectra to the fine structure ones, corresponding to crystalline silicon nitride. The spectral position of observed sharp peaks in the investigated pressure region is red shifted in comparison to the peaks of crystalline silicon oxynitride found recently by other investigators in nitrogen-containing poly-Si as well as in a residual melt of nitrogen-doped CZ-Si. The application of pressure during annealing results in further red shift of the nitrogen-related bands. The observed decrease of frequency of vibrational bands is explained in terms of the pressure induced lowered incorporation of oxygen into growing oxynitride phase.

(2) Enhanced Silicon Band Edge Related Radiation: Origin and Applicability for Light Emitters

T. Arguirov, M. Kittler, W. Seifert, X. Yu

Materials Science and Engineering B **124-125**, 431 (2005)

We have investigated the influence of phosphorous implantation and annealing on the photoluminescence spectra of Si. The implantation was carried out at 750 keV with doses between 1×10^{13} and 2×10^{14} cm⁻². We show that the band edge luminescence of the implantation modified layer at room temperature is low compared to the luminescence from the substrate. The photoluminescence spectra at 80 K are found to depend strongly on the annealing treatment performed (rapid thermal versus furnace annealing). For high implantation doses, a shift in the two-phonon-assisted line is observed and associated with a strong strain

field. The band edge luminescence does not show quenching, but increases upon increase of temperature for the highest implantation dose.

(3) Accurate Modeling of Low-Cost SiGe:C-HBTs Using Adaptive Neuro-Fuzzy Inference System

A. Chakravorty, R.F. Scholz, B. Senapati, D. Knoll, A. Fox, R. Garg, C.K. Maiti

Materials Science in Semiconductor Processing **8**(1-3), 307 (2005)

A low-cost BiCMOS SiGe:C-HBT is accurately modeled using adaptive neuro-fuzzy inference system (ANFIS) for the first time. The Volterra kernel-based approach can be suitable for this new kind of modeling. The model has been trained and tested with different sets of input/output data. Accuracy of the model is checked for all the DC and S parameters in a wide range of bias and frequencies. On the validation of the ANFIS model, the average error is found to be less than 4 %. Especially in high-current and high-frequency regions, the ANFIS model is proved to be excellent unlike most of the physics-based equivalent circuit models that fail to track the actual device behavior.

(4) Strained Silicon on Insulator (SSOI) by Wafer-bonding

S.H. Christiansen, R. Singh, I. Radu, M. Reiche, U. Gösele, D. Webb, S. Bukalo, B. Dietrich

Materials Science in Semiconductor Processing **8**(1-3), 197 (2005)

Strained silicon devices provide for an enhanced carrier mobility compared to that of unstrained silicon devices of identical dimensions. The device performance gets even better when using strained silicon on insulator material. We report experimental procedures based on wafer bonding, smart cutting and selective chemical etching to obtain thin strained silicon (15 nm) on insulator wafers. The starting material is an 8" wafer with pseudomorphically grown strained silicon on a so-called virtual substrate as realized by epitaxial chemical vapor deposition of relaxed SiGe (grown with a grading rate of 10 % Ge in the SiGe-alloy per 1 µm layer deposition) on a Si(001) substrate. The starting and bonded wafers are characterized: (i) structurally using transmission electron microscopy, (ii) topographically, using atomic force microscopy and (iii) the strain is quantified using UV-Raman spectroscopy.

(5) Mechanisms of B Deactivation Control by F Co-Implantation

N.E.B. Cowern, B. Colombeau, J. Benson, and A. J. Smith, W. Lerch, S. Paul, T. Graf, F. Cristiano, X. Hebras, D. Bolze

Applied Physics Letters **86**, 101905 (2005)

Thermal annealing after preamorphization and solid-phase epitaxy of ultrashallow B implants leads to deactivation and diffusion driven by interstitials released from end-of-range defects. F inhibits these processes by forming small clusters that trap interstitials. A competing B&F interaction causes deactivation when F and B profiles overlap. Both pathways suppress B transient enhanced diffusion.

(6) Atomic-Scale Properties of High-k Dielectrics: ab initio Study for Pr-based Materials

J. Dabrowski, A. Fleszar, G. Lippert, G. Lupina, A. Mane, H.J. Müssig, T. Schröder, R. Sorge, H. Thieme, C. Wenger, P. Zaumseil

Advances in Solid State Physics **45**, 339 (2005)

We discuss the atomic and electronic structures and energetics of native point defects and of impurities (Si, Ti, B, moisture) in Pr_2O_3 and, to some extent, also in PrO_x and in $\text{Pr}_2\text{Si}_2\text{O}_7$, as obtained from ab initio total energy calculations. We introduce the concept of Silicon-related Nitrogen-Coordinated Oxygen (SiNCO) which we then use to explain the origin of fixed charge in classical SiO_2 films thermally grown on Si substrates and in high-k dielectrics deposited on Si substrates.

(7) Paving the Way for Wireless Gigabit Networking

J.-P. Ebert, E. Grass, R. Irmer, G. Fettweis, R. Kraemer

IEEE Communication Magazine, GCN (Global Communications Newsletters) **43**(4), 27 (2005)

Wired LANs soared to the gigabit level some years ago, and terabit networks are in place for wide area networking. However, in terms of data rate, wireless short-range networks tend to lag one generation behind wired LANs. The recent second generation of wireless short-range networks offers transmission rates of up to 54 Mb/s. The third wireless LAN ge-

neration is under development and will materialize in the IEEE 802.11n standard in about two years. IEEE 802.11n WLANs will offer a few hundred megabits per second, but the performance gap from wired networks remains. The recently started project Wireless Gigabit with Advanced Multimedia (WIGWAM) aims to close this gap with a heterogeneous 1 Gb/s fourth-generation system based on high-data-rate orthogonal OFDM transmission, MIMO, and efficient MAC protocol techniques.

(8) Preferred Orientation and Anisotropic Growth in Polycrystalline ZnO:Al Films Prepared by Magnetron Sputtering

F. Fenske, B. Selle, M. Birkholz

Japanese Journal of Applied Physics Letters **44**, L662 (2005)

A thorough growth study of thin polycrystalline ZnO:Al samples prepared by DC magnetron sputtering is presented. The atomic areal density as a function of deposition time t was determined by Rutherford backscattering (RBS), from which a growth rate $G(t)$ can be defined. It was found, that in the initial stages of film growth $G(t)$ increases with increasing deposition time up to a thickness of about 300 nm, although the process conditions were kept constant. In addition, the preferred orientation of each sample, as characterized by a $\langle 00.l \rangle$ fiber texture, was quantified by evaluating the texture index J for each sample. The course of $J(t)$ was identified to concomitantly increase with $G(t)$. The variation of both, growth rate and preferred orientation, with deposition time is interpreted to be caused by an anisotropic growth velocity of ZnO grains. It seems that such a close correlation between growth rate and texture has not been observed so far.

(9) SiGe:C BiCMOS-Technology for 77-81 GHz Automotive Radar Applications

G.G. Fischer

Micromaterials and Nanomaterials **4**, 54 (2005)

The introduction of radar sensors into the modern car will lead to significant improvements of comfort (parking aid) and security (collision warning). Although systems with 24 GHz carrier frequency are already in use their maximum car park penetration cannot surpass 7 % because of regulatory issues. Therefore, a switch-over to 77 – 81 GHz until 2014 is mandatory.

Recent improvements in the high-frequency performance of SiGe:C hetero bipolar transistors (HBT) allow Si microelectronics to advance into areas previously restricted to compound semiconductor devices and make it a strong competitor for the application in 77 GHz and 79 GHz voltage controlled oscillators (VCO) – the core circuits of high-frequency radar sensors. VCOs manufactured with IHP's 0.25 μm SiGe:C BiCMOS technology showed good functionality around 77 GHz. Further research includes improving output power and tests of the stability and reliability of the devices under the requirements defined by customer specifications. With the funding of the German Ministry of Education and Research (BMBF) the joint research project KOKON (www.kokon-project.com) was started October 2004 to develop and integrate technologies (with focus on SiGe circuits) for 77/79 GHz radar sensors. The IHP – a member of the Leibniz Association – is partner in the KOKON consortium.

(10) Direct Evidence of Internal Schottky Barriers at NiSi Precipitates in Si by Electron Holography

P. Formanek, M. Kittler

Journal of Applied Physics **97**, 063707 (2005)

Thin NiSi₂ precipitates in n-type Si were analyzed by electron holography. A phase shift of the electron wave was observed around the precipitate and gives direct evidence about the existence of an internal Schottky barrier. The barrier at the interface between the precipitate and the Si matrix, doped with $4 \times 10^{14} \text{ cm}^{-3}$ phosphorus, was estimated to yield about 90 mV. This value is about five times smaller than the dark barrier. The lowering of the barrier can be explained as a consequence of excess charge carriers generated by the incident electron beam.

(11) Application of Electron Holography to Extended Defects

P. Formanek, M. Kittler

Physica Status Solidi **C2**(6), 1878 (2005)

Thin NiSi₂ precipitates in n-type Si were analyzed by electron holography. A phase shift of the electron wave was observed around the precipitate and gives direct evidence about the existence of an internal Schottky barrier. The barrier at the interface between the precipitate and the Si matrix, doped with $4 \times 10^{14} \text{ cm}^{-3}$ phosphorus, was estimated to be about 90 mV. This value

is about five times smaller than the dark barrier. The lowering of the barrier can be explained as a consequence of excess charge carriers generated by the incident electron beam. Additional artifacts like variation of mean inner potential, dead layers, and dynamical diffraction are discussed as well.

(12) Potential and Limitation of Electron Holography in Si Research

P. Formanek, M. Kittler

Solid State Phenomena **108-109**, 603 (2005)

We report on electron holography as a promising candidate for diagnostics in future silicon technology and research. The electron holography determines the local phase shift of the electron wave passing through a sample. The phase is proportional to the 2D projected electrostatic potential in the sample and thus reveals p-n junctions and, indirectly, doping. We demonstrate detection of sub-monolayer boron layers in Si and SiGe, measurement of Ge concentration in SiGe and qualitative 2D oxygen mapping in SiO₂/Si structures with 0.5 nm resolution, and comparison of doping in two bipolar transistors with different base implant. Resolution and noise limits are discussed.

(13) Spectroscopic Ellipsometry for In-Line Process Control of SiGe:C HBT Technology

O. Fursenko, J. Bauer, P. Zaumseil, D. Krüger, A. Goryachko, Y. Yamamoto, K. Köpke, B. Tillack
Materials Science in Semiconductor Processing **8**(1-3), 273 (2005)

Spectroscopic ellipsometry (SE) was successfully applied for in-line thickness and composition control of graded SiGe:C heterojunction bipolar transistors (HBTs). We have calculated a thickness of Si-cap and SiGe:C base, split into the gradient and plateau part and Ge content in the plateau. The procedure included the creation of databases for the refractive index dispersion of all components of HBT stacks using simple one-layer structures, with thickness and composition calibrated by X-ray diffractometry (XRD). These databases (e.g. SiGe:C optical constants vs. Ge content) were applied for thickness and composition characterization of graded HBTs with different profile shapes. The difference between SE and XRD for the estimation of the main structural parameters is discussed. Finally, the suitability of SE for measuring wafer uniformity of HBT layer thickness and composition was demon-

trated, allowing a proper and efficient fine-tuning of the epitaxial growth process.

(14) A DC-10 GHz Amplifier With Digital Offset Correction

H. Gustat

Materials Science in Semiconductor Processing **8**(1-3), 439 (2005)

This work presents a SiGe:C wideband amplifier with a binary CMOS counter for digital offset adjustment. The application of the radix-2 approach to accurate offset correction in a digital calibration loop results in smaller area and less power than common static high-resolution offset correction circuits. The counter bits are weighted with a radix of 1.6, leading to 25 % error tolerance, and thus simple circuits and small devices. A BiCMOS test chip in a 0.25- μ m-CMOS 200-GHz-SiGe:C technology exhibits a correction accuracy well below the measurement noise floor of 50 μ V at only 1 mW additional power consumption. The amplifier operates from DC to 10 GHz on a 3 V supply voltage. Since the adjustment compensates device mismatch, minimum-size transistors can be used. This in turn enhances the RF performance.

(15) A Fully Integrated Low-Power Low-Jitter Clock Synthesizer with 1.2 GHz Tuning Range in SiGe:C BiCMOS

H. Gustat, F. Herzel, I. Shevchenko

Materials Science in Semiconductor Processing **8**(1-3), 451 (2005)

We present an integrated clock synthesizer in SiGe:C BiCMOS technology. The synthesizer is aimed at low-jitter applications requiring a wide continuous frequency range at low power consumption. It uses an nMOS VCO with an LC tank and differential tuning followed by a bipolar dual-modulus prescaler. The circuit draws 28 mA from a 2.5 V supply. The measured rms output jitter of the PLL was below 2 ps over the whole tuning range from 4.9 to 6.1 GHz.

(16) A 2.5 GHz Eight-Phase VCO in SiGe BiCMOS Technology

F. Herzel, W. Winkler

IEEE Transactions on Circuits and Systems II, **52**(3), 140 (2005)

We present a 2.5 GHz voltage-controlled oscillator (VCO) with eight equally distributed phases derived from a 10 GHz LC VCO. Stochastic and static phase errors were obtained by spectrum analyzer measurements in conjunction with an on-chip single-sideband mixer. From the measured phase noise spectrum, we predict an absolute rms jitter contribution of 130 fs in a 2-MHz bandwidth phase-locked loop. A static phase error of less than 0.7 was deduced from the sideband suppression. The eight-phase VCO is tunable from 2.35 to 2.85 GHz and draws 16 mA from a 2.0 V supply. Possible applications include clock and data recovery of a 10 Gb/s signal in a fiber-optic receiver as well as high-precision image rejection receivers and I/Q direct up-converters for radio-frequency applications.

(17) Annealing Behavior of New Nitrogen Infrared Absorption Peaks in Cz Silicon

H. Inoue, M. Nakatsu, K. Tanahashi, H. Yamada-Kaneta, H. Ono, V.D. Akhmetov, O. Lysytskiy, H. Richter

Solid State Phenomena **108-109**, 609 (2005)

New nitrogen related infrared absorption peaks were found at 855, 972, 983 and 1002 cm^{-1} . The annealing temperature dependence and annealing time dependence at 1000 °C and 1100 °C of these peaks were examined and compared with those of known peaks. They behaved similarly with those of 810 and 1018 cm^{-1} peaks and were attributed to the same structure including N-O interstitial pair and oxygen interstitial, NOOi, which is closely related to shallow thermal donors. They decreased at lower temperature and faster at high temperature than nitrogen interstitial pair with oxygen interstitial, NNOi. It is confirmed that NN is dominant at defect formation temperature during cooling after growth. There were no other absorption peaks, such as those due to nitrogen substitutional, interstitial and NO pair.

(18) Investigation of Ostwald Ripening in Nitrogen Doped Czochralski Silicon

G. Kissinger, A. Huber, K. Nakai, O. Lysytskiy, T. Müller, H. Richter, W. von Ammon

Applied Physics Letters **87**, 101904 (2005)

Infrared laser scattering tomography was used to investigate Ostwald ripening in nitrogen-doped Czochralski silicon. Contrary to previous assumptions about oxi-

de precipitation in nitrogen-doped silicon, the results clearly demonstrate that Ostwald ripening takes place during annealing of N-doped silicon wafers at 1000 °C and 1100°C. The higher the nitrogen doping and the higher the temperature the faster the oxide precipitates grow and the faster they split into two fractions. One fraction is growing at the expense of the other.

(19) Oxygen Precipitation in Nitrogen Doped Silicon

G. Kissinger, T. Müller, A. Sattler, W. Häckl, M. Weber, U. Lambert, A. Huber, P. Krottenthaler, H. Richter, W. von Ammon
Solid State Phenomena **108-109**, 17 (2005)

Nitrogen doping of CZ silicon results in an early formation of large precipitate nuclei during crystal cooling, which are stable at 900 °C. These are prone to develop stacking faults and high densities of defects inside defect denuded zones of CZ silicon wafers. Simultaneous doping of FZ silicon with nitrogen and oxygen results in two main stages of precipitate nucleation during crystal cooling, an enhanced nucleation around 800 °C, which is nitrogen induced, and a second enhancement around 600 °C, which depends on the concentration of residual oxygen on interstitial sites. A combined technique of ramping with 1 K/min from 500-1000 °C with a final anneal at 1000 °C for 2 h and lateral BMD measurement by SIRM provides a possibility to delineate \sqrt{G} on nitrogen-doped silicon wafers. Surface segregation of nitrogen and oxygen during out-diffusion can explain the enhanced BMD formation in about 10 μm depth and the suppressed BMD formation in about 40 μm depth below the surface. The precipitate growth is enhanced in regions where nitrogen is filled up again after a preceding out-diffusion.

(20) Silicon-based Light Emission after Ion Implantation

M. Kittler, T. Arguirov, A. Fischer, W. Seifert
Optical Materials **27**, 967 (2005)

Electroluminescence of boron and phosphorus implanted samples has been studied for various implantation and annealing conditions. Phosphorus implantation is found to have a similar effect on light emission as boron implantation. The band-to-band luminescence of phosphorus implanted diodes is observed to increase by more than one order of magnitude upon rising the sample temperature from 80 K to 300 K and a

maximum internal quantum efficiency of 2 % has been reached at 300 K. The remarkably high band-to-band luminescence is attributed to a high bulk Shockley-Read-Hall lifetime, likely promoted by the gettering action of the implanted phosphorus. The anomalous temperature behavior of the efficiency can be explained by a temperature dependence of the lifetime characteristic of shallow traps.

(21) Silicon Based Light Emitters for On-Chip Optical Interconnects

M. Kittler, T. Arguirov, W. Seifert, X. Yu, M. Reiche
Solid State Phenomena **108-109**, 749 (2005)

Electroluminescence of B and P implanted samples has been studied. P implantation is found to have a similar effect on light emission as B implant. The band-to-band (BB) luminescence of P implanted diodes is observed to increase by more than one order of magnitude upon rising the temperature and an internal efficiency of 2 % has been reached at 300 K. An efficiency larger than 5 % seems to be reachable. The strong BB line emission at 1.1 μm is attributed to high bulk SRH lifetime. The BB line escapes from the substrate below the p-n junction. It is not due to the implantation-related defects/dislocations. The luminescence spectrum can be tailored to achieve dominance of the dislocation-related D1 line at about 1.5 μm . It is observed that a regular periodic dislocation network, formed by Si wafer direct bonding with a specific misorientation, exhibits even at 300 K only D1 photoluminescence. Such a dislocation network is believed to be a serious candidate to gain an efficient Si-based light emitter.

(22) Advanced Activation of Ultra-Shallow Junctions Using Flash-assisted RTP

W. Lerch, S. Paul, J. Niess, S. McCoy, T. Selinger, J. Gelpey, F. Cristiano, F. Severac, M. Gouvello, S. Boninelli, P. Pichler, D. Bolze
Materials Science and Engineering B **124-125**, 24 (2005)

A key issue associated with the continuous reduction of dimensions of CMOS transistors is the realization of highly conductive, ultra-shallow junctions for source/drain extensions. Millisecond annealing as an equipment technology provides an ultra-sharp temperature peak of 1.6 ms width which favors dopant activation but nearly suppresses dopant diffusion to form extremely shallow, highly electrically-activated junctions without

melting the substrate. On boron beamline implanted wafers the formation of junctions at peak temperatures ranging from 1275 up to 1325 °C was investigated. In the special case of boron, silicon wafers deeply pre-amorphized with Ge were also used. The thermal stability of these boron profile distributions was evaluated by subsequent thermal anneals ranging from 250 °C to 1050 °C with times from a few seconds to several hundred seconds. From these experiments the deactivation/re-activation mechanism for subsequent annealing can be explained. All the junctions were analyzed by four-point probe measurements; selected samples were analyzed by Hall-effect, secondary ion mass spectrometry (SIMS), and transmission electron microscopy (TEM).

(23) Initial Stages of the Epitaxial Growth of Pr_2O_3 on Si(111) Studied by LEED and STM

L. Libralesso, T. Schröder, T.-L. Lee, J. Zegenhagen
Surface Science **598**, L347 (2005)

The initial stages of the molecular beam epitaxy growth of Pr_2O_3 on atomically clean Si(111) have been studied in ultra-high vacuum by low energy electron diffraction and scanning tunneling microscopy. At very low coverages, the oxide nuclei decorate the dimer rows of the silicon surface as line structure forming open triangles. At higher coverages, two-dimensional, equilateral, triangular islands with a fairly narrow size distribution and a well defined thickness are observed. Island nucleation occurs both at step edges and on the terraces. Upon coalescence at coverages beyond one monolayer, the surface is covered by a flat and pseudomorphic oxide film with a (111) surface unit cell.

(24) Si Segregation into Pr_2O_3 and La_2O_3 High-k Gate Oxides

G. Lippert, J. Dabrowski, V. Melnik, R. Sorge, Ch. Wenger, P. Zaumseil, H.-J. Müssig
Applied Physics Letters **86**(4), 042902 (2005)

Pr and La oxide thin films were investigated in the context of their application as high-k dielectrics in Complementary Metal Oxide (CMOS) technology. The films were deposited by Molecular Beam Epitaxy (MBE) on bare and TiN-covered Si(001). The influence of growth and post-deposition annealing on the composition and electrical parameters was studied. We observed Si penetration from bare Si(001) into the

growing film. Based on the results of capacitance-voltage (CV) measurements and ab initio calculations we conclude that Si is a source of defects responsible for leakage currents.

(25) Preparation of Praseodymium Silicate Dielectrics with an Atomically Abrupt Interface on Si(100)

G. Lupina, T. Schröder, J. Dabrowski, C. Wenger, A. Mane, G. Lippert, H.-J. Müssig, P. Hoffmann, D. Schmeisser
Applied Physics Letters **87**(9), 092901 (2005)

Synchrotron radiation x-ray photoelectron spectroscopy was applied to study the solid state reaction between praseodymium and thin silicon dioxide layers on Si(100). Nondestructive depth profiling studies by variation of the incident photon energy indicate after praseodymium deposition at room temperature the reaction of the upper silicon dioxide to praseodymium oxide and silicide. High-temperature annealing of films with an appropriate praseodymium / silicon dioxide ratio results in homogeneous praseodymium silicate films with an atomically abrupt interface. Ab initio calculations corroborate the results of the photoemission study.

(26) Modified Virtually Scaling Free Adaptive CORDIC Rotator Algorithm and Architecture

K. Maharatna, S. Banerjee, E. Grass, M. Krstic, A. Troya
IEEE Transactions on Circuits and Systems for Video Technology (CSVT) **15**(11), 1463 (2005)

In this paper, we proposed a novel Coordinate Rotation Digital Computer (CORDIC) rotator algorithm that converges to the final target angle by adaptively executing appropriate iteration steps while keeping the scale factor virtually constant and completely predictable. The new feature of our scheme is that, depending on the input angle, the scale factor can assume only two values, viz., 1 and $1/\sqrt{2}$, and it is independent of the number of executed iterations, nature of iterations, and word length. In this algorithm, compared to the conventional CORDIC, a reduction of 50 % iteration is achieved on an average without compromising the accuracy. The adaptive selection of the appropriate iteration step is predicted from the binary representation of the target angle, and no further arithmetic computation in the angle approximation datapath is required. The convergence range of the proposed

CORDIC rotator is spanned over the entire coordinate space. The new CORDIC rotator requires 22 % less adders and 53 % less registers compared to that of the conventional CORDIC. The synthesized cell area of the proposed CORDIC rotator core is 0.7 mm² and its power dissipation is 7 mW in IHP in-house 0.25 µm BiCMOS technology.

(27) A CMOS Process-Compatible Wet-Etching Recipe for the High-k Gate Dielectrics Pr₂O₃ and Pr_{2-x}Ti_xO₃

A.U. Mane, Ch. Wenger, T. Schröder, P. Zaumseil, G. Lippert, G. Weidner, H.-J. Müssig
Journal of the Electrochemical Society **152**(6), C399 (2005)

The fabrication of complementary metal oxide semiconductor (CMOS) structures with praseodymium oxide (Pr₂O₃) or titanium-doped praseodymium oxide (Pr_{2-x}Ti_xO₃) (0x1) layers as integrated high-k gate dielectrics requires the development of a process-compatible etching recipe. Different wet-etching processes in acid-based chemistry were evaluated and solutions of diluted sulfuric acid were identified as suitable etchants for Pr₂O₃ and Pr_{2-x}Ti_xO₃ layers on Si substrates. Metal-oxide-semiconductor stacks with poly-Si as the potential gate electrode were patterned with the help of tetramethyl ammonium hydroxide as the selective etchant attacking the poly-Si gate electrode material but not the underlying Pr-based high-k gate dielectric layers.

(28) Process Integration of Pr-Based High-k Dielectrics

A.U. Mane, C. Wenger, G. Lupina, T. Schröder, G. Lippert, R. Sorge, P. Zaumseil, G. Weidner, J. Dabrowski, H.-J. Müssig
Microelectronic Engineering **82**, 148 (2005)

We present microprocessing compatibility of Pr-based high-k gate dielectrics for complementary metal-oxide-semiconductor (CMOS) devices. MOS structures integrated with boron-doped poly-Si and Pr-based oxides layers were deposited by molecular beam epitaxy (MBE) process. Reactive ion etching (RIE) with CF₄/O₂ plasma was used to etch the poly-Si layer selectively. Diluted H₂SO₄ based solutions was used to etch Pr-based oxides layers. Details of etch kinetics of Pr-based oxides layers, poly-Si and electrical properties of MOS devices are presented.

(29) Electric-dipole Spin Resonance Signals Related to Extended Agglomerates of Interstitial in Silicon

T. Mchedlidze, S. Binetti, A. Le Donne, S. Pizzini, M. Suezawa

Journal of Applied Physics **98**, 043507 (2005)

Three electric-dipole spin resonance (EDSR) signals from defects having C1h symmetry were detected in Czochralski-grown silicon (Cz-Si) samples. The signals labelled TU7, TU8 and TU9 were detected after subjecting of the samples to two-step annealing procedures at 450 °C and at 650 °C for prolonged times. Formation and structural evolution of large interstitial agglomerates known as rod-like defects (RLD) occur in Cz-Si during analogous annealing procedures. Comparison of the EDSR signal details with the formation peculiarities and the defect structures of the RLDs, inferred from previous investigations, allows assigning of the TU7, TU8 and TU9 spectra to the line-interstitial defects, the planar defects and the dislocation dipoles, respectively. Correlations of the EDSR signals and peculiarities in the PL spectra for the samples are reported.

(30) Formation and Properties of Iron-Phosphorus and Iron-Phosphorus-Hydrogen Complexes in Silicon

T. Mchedlidze

Solid State Phenomena **108-109**, 379 (2005)

Hitherto unreported ESR signal, labelled TU10, was detected after annealing of electron-irradiated silicon samples doped with phosphorus, iron and hydrogen. The ESR spectrum corresponds to a complex having monoclinic-I symmetry and S = 3/2 spin-state. Hyperfine structure of the TU10 spectrum suggests participation of two nucleus with spin I = 1/2 and 100 % abundance in the core of the related defect. Doping of samples with hydrogen-deuterium mixture revealed presence of one hydrogen atom in the complex. The second nucleus with I = 1/2 is apparently a phosphorus atom. Presence of single iron atom was verified by doping with iron heaving modified isotope content. An intensity of the previously reported TU6 signal, related to iron-phosphorus complex, was significantly suppressed in hydrogen-doped samples.

(31) Precipitation Enhancement of so Called Defect-Free Czochralski Silicon Material

T. Müller, G. Kissinger, P. Krottenthaler, C. Seuring,
R. Wahlich, W. von Ammon
Solid State Phenomena **108-109**, 11 (2005)

Thermal treatments to enhance precipitation like RTA, ramp anneal and argon anneal were performed on low oxygen 300 mm wafers without vacancy or interstitial agglomerates (so called defect-free material). Best results were achieved using high temperature argon anneal leading to a homogenous BMD and denuded zone formation. Furthermore the getter efficiency was positively tested by intentional Ni-contamination. Concepts to overcome the slip danger like improved support geometries and nitrogen codoping were also evaluated and are seen to be beneficial.

(32) Enhanced Relaxation of SiGe Layers by He Implantation Supported by in situ Ultrasonic Treatments

B. Romanjuk, V. Kladko, V. Melnik, V. Popov,
V. Yukhymchuk, A. Gudymenko, Ya. Olikh,
G. Weidner, D. Krüger
Materials Science in Semiconductor Processing **8**(1-3), 171 (2005)

Helium implantation-enhanced strain relaxation of SiGe layers grown pseudomorphically on Si substrates is an interesting alternative for the creation of strained Si CMOS structures. Here we demonstrate the application of additional in situ ultrasonic treatment (UST) during He ion implantation for the formation of relaxed $\text{Si}_{0.8}\text{Ge}_{0.2}$ buffer layers. By Raman spectroscopy and X-ray diffraction we show increased relaxation of the SiGe layers under the influence of UST. A rectangular dislocation network with a high dislocation density of about $10^9\text{-}10^{10}\text{ cm}^{-2}$ concentrated near the interface between the SiGe layer and the Si substrate is shown by TEM for 100 nm SiGe/Si heterostructures after heat treatment at 750 °C, 60 s. Application of ultrasonic waves during He implantation keeps a low surface roughness of about 0.5 nm.

(33) High-Frequency SiGe:C HBTs With Elevated Extrinsic Base Regions

H. Rücker, B. Heinemann, R. Barth, D. Knoll,
P. Schley, R. Scholz, B. Tillack, W. Winkler
Materials Science in Semiconductor Processing **8**(1-3), 279 (2005)

This paper reports on the transistor design of high-speed SiGe HBTs with low parasitic resistances and capacitances. Elevated extrinsic base regions and a low-resistance collector design were integrated in a SiGe:C BiCMOS technology to simultaneously minimize base and collector resistances and base-collector capacitance. This technology features CML ring oscillator delays of 3.6 ps per stage for HBTs with f_T/f_{max} values of 190/243 GHz and a BV_{CEO} of 1.9 V.

(34) Titanium-Added Praseodymium Silicate High-k Layers on Si(001)

T. Schröder, G. Lupina, J. Dabrowski, A. Mane,
C. Wenger, G. Lippert, H.-J. Müssig
Applied Physics Letters **87**(2), 022902 (2005)

Titanium-added praseodymium silicate layers on Si(001) are promising high-k insulators for silicon-based nanoelectronic devices. Synchrotron radiation x-ray photoelectron spectroscopy was applied to study the effect of titanium additives on the praseodymium silicate/Si system. Nondestructive depth profiling by variation of the photon energy shows that thermal annealing activates the diffusion of deposited titanium into the praseodymium silicate. A homogeneous praseodymium titanium silicate layer is formed that shows high-quality electrical properties.

(35) Structure, Twinning Behaviour and Interface Composition of Epitaxial Si(111) Films on Pr_2O_3 (0001)/Si(111) Support Systems

T. Schröder, P. Zaumseil, G. Weidner, G. Lupina,
C. Wenger, H.-J. Müssig, P. Stork,
Journal of Applied Physics **98**, 123513 (2005)

The structure of epitaxial Si overlayers on a hexagonal Pr_2O_3 (0001)/Si(111) substrate system was investigated by a combination of x-ray reflectivity, specular x-ray diffraction, off-specular grazing incidence x-ray diffraction, and transmission electron microscopy. The Pr_2O_3 film grows on the Si(111) substrate in the (0001)-oriented hexagonal phase matching the in-plane symmetry by aligning the [100] oxide along the bulk [01] Si direction. The hexagonal Pr_2O_3 (0001) surface induces the growth of [111]-oriented cubic-Si epilayers exhibiting a microstructure which is composed of two types of domains. The ABC-stacked domains preserve the crystal orientation of the substrate, while the CBA-stacked domains are rotated by 180°. A depth profile of the chemical composition of the epi-Si/ Pr_2O_3 /

Si(111) material stack was recorded by combining ion-beam sputtering techniques with x-ray photoelectron spectroscopy.

(36) Structure and Strain Relaxation Mechanisms of Ultrathin Epitaxial Pr_2O_3 Film on Si(111)

T. Schröder, T.-L. Lee, L. Libralesso, I. Jourmard, J. Zegenhagen, P. Zaumseil, C. Wenger, G. Lippert, J. Dabrowski, H.-J. Müssig
Journal of Applied Physics **97**(7), 074906 (2005)

The structure of ultrathin epitaxial Pr_2O_3 films on Si(111) was studied by synchrotron radiation-grazing incidence x-ray diffraction. The oxide film grows as hexagonal Pr_2O_3 phase with its (0001) plane attached to the Si(111) substrate. The hexagonal (0001) Pr_2O_3 plane matches the in-plane symmetry of the hexagonal Si(111) surface unit cell by aligning the $[10\bar{1}0]$ Pr_2O_3 along the $[11\bar{2}]$ directions. The small lattice mismatch of 0.5 % results in the growth of pseudomorphic oxide films of high crystalline quality with an average domain size of about 50 nm. The critical thickness t_c for pseudomorphic growth amounts to 3.0 ± 0.5 nm. The relaxation of the oxide film from pseudomorphism to bulk behavior beyond t_c causes the introduction of misfit dislocations, the formation of an in-plane small angle mosaicity structure, and the occurrence of a phase transition towards a (111) oriented cubic Pr_2O_3 film structure. The observed phase transition highlights the influence of the epitaxial interface energy on the stability of Pr_2O_3 phases on Si(111). A mechanism is proposed which transforms the hexagonal (0001) into the cubic (111) Pr_2O_3 epilayer structure by rearranging the oxygen network but leaving the Pr sublattice almost unmodified.

(37) Impact of Low Temperature Hydrogenation on Recombination Activity of Dislocations in Silicon

O.F. Vyvenko, M. Kittler, W. Seifert
Solid State Phenomena **108-109**, 151 (2005)

Silicon samples doped with gallium and intentionally contaminated with iron have been studied by means of electron beam current (EBIC), capacitance voltage (CV) and deep level transient spectroscopy (DLTS) methods. Reverse bias anneal (RBA) treatments at temperatures of 390-420 K were used to move hydrogen and dissolved iron atoms away from the surface. A new procedure

was developed to find dislocations lying on desirable depth from the surface and to analyze the depth distribution of their recombination contrast. Iron contaminated dislocations do not noticeably change their recombination activity when kept in an electrical field as high as 104 V/cm at 420 K for several hours. This implies a tight binding of iron atoms at dislocations. The binding energy of iron with dislocations seems to be much larger than for Fe-Ga and H-Ga pairs. Low temperature hydrogenation of iron contaminated dislocations does not produce any passivation effect. In opposite, the recombination activity of the dislocations significantly increases after RBA treatment.

(38) Recombination Activity and Electrical Levels of Dislocations in p-Type SiGe Structures: Impact of Copper Contamination and Hydrogenation

O.F. Vyvenko, M. Kittler, W. Seifert, M.V. Trushin
Physica Status Solidi **C2** (6), 1852 (2005)

Deep levels, associated with misfit dislocations in clean and copper contaminated p-type $\text{Si}/\text{Si}_{0.98}\text{Ge}_{0.02}/\text{Si}$ structures, are under consideration. In the as-grown (non-contaminated) samples dislocations were found to exhibit a very low recombination activity, detectable with the electron-beam-induced current technique only at low temperatures. Deep-level-transient spectroscopy revealed a dislocation-related hole trap level at $E_t = E_v + 0.2$ eV which was identified as band-like. The position of the observed level is close to the theoretically predicted hole trap state of the intrinsic stacking fault between a dissociated dislocation. Contamination with a low copper concentration (5 ppb) gave rise to a large increase of the recombination activity of the dislocations and to the appearance of another dislocation-related defect level at $E_t = E_v + 0.32$ eV. Hydrogenation of the copper contaminated sample by a treatment with an acid solution and subsequent reverse-bias anneal at 380 K resulted in the evolution of the levels of substitutional copper and its complexes with hydrogen.

(39) MIM Capacitors Using Amorphous High-k PrTi_xO_y Dielectrics

C. Wenger, R. Sorge, T. Schröder, A.U. Mane, G. Lippert, G. Lupina, J. Dabrowski, P. Zaumseil, H.-J. Müssig
Microelectronic Engineering **80**, 313 (2005)

Capacitor performance of amorphous PrTi_xO_y dielectric films deposited on TiN_x metal electrodes to form MIM structures with Al top electrodes is demonstrated for the first time. The PrTi_xO_y capacitors were fabricated within the temperature budget of back end processes. Preliminary data on the composition of the dielectric layers and the interaction of water with the films was obtained by X-ray photoelectron spectroscopy (XPS). The I(V) and C(V) device characteristics are discussed.

(40) A 117 GHz LC-Oscillator in SiGe:C BiCMOS Technology

W. Winkler, J. Borngräber, B. Heinemann
Materials Science in Semiconductor Processing
8(1-3), 459 (2005)

In this paper a voltage-controlled oscillator (VCO) is presented reaching oscillation frequencies well above 100 GHz. The oscillator has been fabricated in a 200 GHz SiGe:C BiCMOS technology with 0.25 μm minimum feature size. In the design of the VCO two circuit approaches were considered. The first used transmission-lines in the resonator and the second used inductors above the silicon substrate. It is shown by simulation that by using inductors a higher oscillation frequency can be obtained. The fabricated oscillator has a tuning range from 113.2 to 117.2 GHz at a supply voltage of -3 V. This oscillation frequency is the highest reported so far for a silicon-based transistor technology.

(41) High Resolution XRD Characterization of SiGeC Structures for High Frequency Microelectronics Applications

P. Zaumseil
Journal of Alloys and Compounds **401**, 254 (2005)

It is demonstrated how high resolution X-ray diffractometry (XRD) in comparison to different other characterization techniques, reflectometry, spectroscopic ellipsometry, Auger electron spectroscopy, secondary ion mass spectroscopy, and transmission electron microscopy, can be used to analyze the layer properties of typical SiGeC hetero-bipolar transistor (HBT) structures. For three different HBTs the parameters of Si cap and total SiGeC layer thickness, and the maximum Ge content are measured and the error limits of the different techniques are discussed. The values obtained agree very well within the error limits. Concerning layer thickness an achievable accuracy of about 1 nm is

realistic and reproducible in a routine process. The highest accuracy in Ge content determination of about 0.5 % can be realized by XRD and well-calibrated spectroscopic ellipsometry. XRD measurements in small (0.5x0.5 mm²) structures show comparable results with a laboratory source and synchrotron radiation.

(42) A Complex X-Ray Characterization of Epitaxially Grown High-k Gate Dielectrics

P. Zaumseil, T. Schröder
Journal of Physics D **38**, A179 (2005)

Different x-ray techniques are used to characterize Pr_2O_3 layers epitaxially grown on Si substrates. X-ray reflectometry is the preferred technique to determine the layer thickness and to detect and characterize possible interface layers. With standard x-ray diffraction (XRD), we found for 100 Si substrates that Pr_2O_3 grows in its cubic phase with the 110 direction perpendicular to the surface, while the hexagonal phase in 0001 orientation is preferred for 111 Si. In the thickness range of microelectronics applications, Pr_2O_3 layers can be considered as well-ordered heteroepitaxial structures. The relaxation of the oxide layer from pseudomorphism to bulk behaviour was studied in the technologically important thickness range (1-10 nm) by synchrotron radiation grazing incidence XRD.

(43) Structural Characterization of Epitaxial Si/ Pr_2O_3 /Si(111) Heterostructures

P. Zaumseil, T. Schröder, G. Weidner
Solid State Phenomena **108-109**, 741 (2005)

The use of heteroepitaxial Si/ Pr_2O_3 /Si(111) systems as semiconductor-insulator-semiconductor (SIS) stacks in future applications requires a detailed structural characterization. We used X-ray reflectivity (XRR) to control layer thickness and interface roughness, standard X-ray diffraction (XRD) to analyze the Pr_2O_3 phase, orientation and crystal perfection, and grazing incidence XRD to study the thin epitaxial Si top layer. Transmission electron microscopy (TEM) was used to prove the results by direct imaging on a microscopic scale. Pr_2O_3 grows epitaxially in its hexagonal phase and (0001) orientation on Si(111) substrates. An epitaxial Si overgrowth in (111) orientation and good perfection is possible, but such Si layers exhibit two stacking twins, one with the same in-plane orientation as the substrate and one rotated by 180° around the Si [111] direction.

- (44) **FTIR Spectroscopic System with Improved Sensitivity**
V.D. Akhmetov, H. Richter
Proc. DRIP XI, 37 (2005)
- (45) **Optimization of Anti-reflective Coatings for Lithography Applications**
J. Bauer, S. Virko, B. Kuck, T. Grabolla, V. Melnik, O. Fursenko, W. Mehr
Proc. SPIE **5835**, 263 (2005)
- (46) **Optimization of Anti-reflective Coatings for Lithography Application**
J. Bauer, S. Virko, B. Kuck, T. Grabolla, V. Melnik, O. Fursenko, W. Mehr
GMM-Fachberichte, 177 (2005)
- (47) **A Low-Power, 10 Gs/s Track-and-Hold Amplifier in SiGe BiCMOS Technology**
Y. Borokhovych, H. Gustat, B. Tillack, B. Heinemann, Y. Lu, W.-M. Lance Kuo, X. Li, R. Krithivasan, J.D. Cressler
Proc. ESSCIRC, 263 (2005)
- (48) **Area Efficient Hardware Implementation of Elliptic Curve Cryptography by Iteratively Applying Karatsuba's Method**
Z. Dyka, P. Langendörfer
Proc. Design Automation and Test (DATE), 70 (2005)
- (49) **Enhanced GALS Techniques for Datapath Applications**
E. Grass, F. Winkler, M. Krstic, A. Julius, C. Stahl, M. Piz
Integrated Circuit and System Design, 15th Int. Workshop PATMOS, Berlin Springer Verlag, 581 (2005)
- (50) **NOR/OR Register Based ECL Circuits for Maximum Data Rate**
H. Gustat, J. Borngräber
Proc. BCTM, 90 (2005)
- (51) **System-Level Simulation of a Noisy Phase-Locked Loop**
F. Herzel
Proc. 13th European Gallium Arsenide and other Semiconductor Application Symposium, 193 (2005)
- (52) **Frequency Synthesis for 60 GHz OFDM Systems**
F. Herzel, M. Piz, E. Grass
Proc. 10th International OFDM Workshop, 303 (2005)
- (53) **Combination of Optical Measurements and Precipitation Theory to Overcome the Obstacles of Detection Limits**
G. Kissinger, T. Müller, A. Sattler, W. Häckl, P. Krotenthaler, T. Grabolla, H. Richter, W. von Ammon
Proc. DRIP XI, 67 (2005)
- (54) **Dislocation Engineering for a Si-Based Light Emitter at 1.5 μm**
M. Kittler, M. Reiche, T. Arguirov, W. Seifert, X. Yu
Technical Digest IEDM, 1027 (2005)
- (55) **A Low-Cost SiGe:C BiCMOS Technology with Embedded Flash Memory and Complementary LDMOS Module**
D. Knoll, A. Fox, K.-E. Ehwald, R. Barth, A. Fischer, B. Heinemann, H. Rücker, P. Schley, R. Scholz, F. Korndörfer, B. Senapati, V.E. Stikanov, B. Tillack, W. Winkler, Ch. Wolf, P. Zaumseil
Proc. BCTM, 132 (2005)
- (56) **BIST Testing for GALS Systems**
M. Krstic, E. Grass
Proc. 8th EUROMICRO Conference on Digital System Design - Architecture, Methods and Tools (DSD), 10 (2005)
- (57) **Request-driven GALS Technique for Wireless Communication System**
M. Krstic, E. Grass, C. Stahl
Proc. IEEE International Symposium on Asynchronous Circuits and Systems (ASYNC), 76 (2005)
- (58) **Privacy and Convenient Up Time of Mobile Devices: An Antagonism?**
P. Langendörfer
Proc. Research Trends in Science and Technology (RTST), Abstract book, 3 (2005)
- (59) **More Privacy in Context-aware Platforms: User Controlled Access Right Delegation Using Kerberos**
P. Langendörfer, K. Piotrowski

- Proc. 4th WSEAS International Conference on Information Security, Communications and Computers (ISCOCO), 542 (2005)
- (60) Charged Location Aware Services**
P. Langendörfer, K. Piotrowski, M. Maaser
Proc. IEEE International Conference on Mobile Business (ICMB), 116 (2005)
- (61) Implementation Independent Profiling of SDL Specifications**
P. Langendörfer, M. Lehmann
Proc. Software Engineering, 155 (2005)
- (62) Is the IEEE 802.11 MAC Layer Suitable for Car-to-Car Communication ?**
W. Lohmann, J.-P. Ebert, M. Grade, A. Lübke, R. Kraemer
Proc. 1st Workshop on Wireless Vehicular Communications and Services for Breakdown Support and Car Maintenance (W-CarsCare'05), 28 (2005)
- (63) A 8-bit, 12 GSample/sec SiGe Track-and-Hold Amplifier**
Y. Lu, W.-M. L. Kuo, X. Li, R. Krithivasan, J.D. Cressler, Y. Borokhovych, H. Gustat, B. Tillack, B. Heinemann
Proc. BCTM, 148 (2005)
- (64) Automated Negotiation of Privacy Contracts**
M. Maaser, P. Langendörfer
Proc. 29th Annual International Computer Software and Applications Conference, 505 (2005)
- (65) An Efficient Strategy of Processing Distributed Location Based Events**
O. Maye
Proc. IEEE International Conference on Pervasive Services (ICPS'05), 218 (2005)
- (66) The Impact of Channel Engineering on the Performance and Reliability of LDMOS Transistors**
N.R. Mohapatra, K.-E. Ehwald, R. Barth, H. Rücker, D. Bolze, P. Schley, D. Schmidt, H.-E. Wulf
Proc. ESSDERC, 481 (2005)
- (67) Design of Wireless Systems Utilizing Scratchpad Memories**
G. Panic, Z. Stamenkovic, K. Tittelbach-Helmrich, J. Lehmann, G. Schoof
Proc. IP Based SoS Design (IP-SOC), 221 (2005)
- (68) Charged Location Aware Services**
K. Piotrowski, P. Langendörfer, M. Maaser, G. Spichal, P. Schwander
Proc. International Workshop on Wireless Information Systems (WIS-2005), 33 (2005)
- (69) Plasma Etching of Carbon Hard Mask Stacks for Sub-100nm Technologies**
H.H. Richter, K.A. Pears, M. Markert, S. Günther, S. Marschmeyer, H. Silz, G. Weidner, H. Kirmse, W. Neumann
Proc. 12. Bundesdeutsche Fachtagung Plasmatechnologie, 132 (2005)
- (70) A Class AB 6th Order Log-Domain Filter in BiCMOS with 100-500 MHz Tuning Range**
K. Schmalz, M.A. Teplichuk, J.I. Sewell
Proc. European Conference on Circuit Theory and Design (ECCTD) II, 111 (2005)
- (71) Hazard Detection in GALS Wrapper: A Case Study**
C. Stahl, W. Reisig, M. Krstic
Proc. 5th Int. Conf. on Application of Currency to System Design (ASCD), 234 (2005)
- (72) A Fully Integrated 60 GHz LNA in SiGe:C BiCMOS Technology**
Y. Sun, J. Borngräber, F. Herzel, W. Winkler
Proc. IEEE Bipolar/BiCMOS Circuits and Technology (BCTM), 14 (2005)
- (73) Atomic Layer Processing for Doping of SiGe**
B. Tillack, Y. Yamamoto, D. Bolze, B. Heinemann, H. Rücker, J. Murota, W. Mehr
Proc. 1st International Workshop on New Group IV Semiconductor Nanoelectronics, Program & Abstracts, 11 (2005)
- (74) Atomic Control of SiGe Epitaxy and Doping**
B. Tillack, Y. Yamamoto, K.-D. Bolze, B. Heinemann, H. Rücker, D. Knoll, D. Wolansky, J. Murota, W. Mehr

Proc. of the 4th International Conference on Silicon Epitaxy and Heterostructures (ICSI-4), Program & Abstracts, 82 (2005)

(75) Low-Complexity Initialization of Adaptive Equalizers Using Approximate Channel Inverse

G. Wang, R. Kraemer

Proc. 5th IEEE International Symposium on Signal Processing and Information Technology (IEEE ISSPIT 2005), 694 (2005)

(76) Low-Power 71 GHz Static Frequency Divider in SiGe:C HBT Technology

L. Wang, J. Borngräber, G. Wang, Z. Gu, A. Thiede International Microwave Symposium (IEEE MTT-S) P. (2005)

(77) 60 GHz Circuits in SiGe HBT Technology

W. Winkler

Proc. Compound Semiconductor IC Symposium (CSICS), 109 (2005)

(78) Millimeter-Wave Integrated Circuits in SiGe:C BiCMOS Technology

W. Winkler

Proc. Microwave Workshop and Exhibition (MWE 2005), 459 (2005)

(79) A Fully Integrated BiCMOS PLL for 60 GHz Wireless Applications

W. Winkler, J. Borngräber, B. Heinemann, F. Herzel
Proc. International Solid State Circuits Conference (ISSCC 2005), 406 (2005)

(80) Chemical Vapor Phase Etching of Polycrystalline Selective to Epitaxial SiGe

Y. Yamamoto, B. Tillack, K. Köpke, O. Fursenko
Proc. 4th International Conference on Silicon Epitaxy and Heterostructures (2005)

(81) P Doping Control During SiGe:C Epitaxy

Y. Yamamoto, B. Tillack, K. Köpke, R. Kurps
Proc. of the 4th International Conference on Silicon Epitaxy and Heterostructures, 200 (2005)

(82) X-Ray Reflectivity Characterization of Thin Film and Multilayer Structures

P. Zaumseil

Materials for Information Technology / E. Zschech, C. Whelan, T. Mikolajick. – Berlin, Springer Verlag (2005)

Eingeladene Vorträge Invited Presentations

- (1) **Atomic-Scale Properties of High-k Dielectric for CMOS: ab-initio Study of Pr-based Materials**
J. Dabrowski, A. Fleszar
69. Annual Meeting of the DPG, Berlin, March 04-09, 2005, Germany
- (2) **Pseudopotential Studies of Pr Oxides: Electronic Properties, Native Defects and Impurities**
J. Dabrowski, A. Fleszar
ESF Exploratory Workshop on: Rare Earth Oxide Thin Films: Growth, Characterization and Applications, San Remo, May 11-13, 2005, Italy
- (3) **On Emerging Automotive Safety by Sensor-based Assistance Technology**
J. deMeer
Berlin – Prague – Vienna - European Competence and Vision for Future Transport Technologies – Workshop on Automotive Technologies, Brussels, September 22, 2005, Belgium
- (4) **Berichterstattung aus NI27b IT Sicherheitstechnologie**
J. deMeer
DIN Normenausschuß Informationstechnik NI27 – IT Sicherheitstechnologien und NI37 – Biometrie und Sicherheit, Frankfurt (Oder), September 15-16, 2005, Germany
- (5) **On Automotive Safety Related to IST 7th Framework Programme**
J. deMeer
TSB - Arbeitskreis Verkehrstelematik & Logistik, Berlin, May 11, 2005, Germany
- (6) **Körpernahe Funknetze zur Fernüberwachung des Gesundheitszustandes von Patienten**
J.-P. Ebert, D. Dietterle
14. Sommertagung der Berliner Chirurgischen Gesellschaft, September 01, 2005, Frankfurt (Oder)
- (7) **SiGe:C BiCMOS-Technologie für 77-81 GHz Radarsysteme im Automobilbau**
G.G. Fischer
MicroCar 2005, Leipzig, June 22, 2005, Germany
- (8) **Electron Holography in Si Research**
P. Formanek, M. Kittler
2nd Sino-German Symposium "The Silicon Age", Cottbus, September 22, 2005, Germany
- (9) **European Research Institutes of Excellence**
H.G. Grimmeiss, W. Mehr
University Madrid, October 2005, Spain
- (10) **Defects in Large Diameter CZ Silicon**
G. Kissinger
2nd Sino-German Symposium "The Silicon Age", Cottbus, September 22, 2005, Germany
- (11) **Silicon-Based Light Emission after Ion Implantation: Role of Defects and of Crystalline Perfection**
M. Kittler
CNR-IMM Bologna, February 2, 2005, Italy
- (12) **Self Organized Pattern Formation of Biomolecules at Si Surfaces**
M. Kittler, X. Yu, O.F. Vyvenko, M. Birkholz, W. Seifert, M. Reiche, T. Wilhelm, T. Arguirov, A. Wolff, W. Fritzsche, M. Seibt
E-MRS Spring Meeting, Strasbourg, May 31 – June 03, 2005, France
- (13) **Location Based Services and Requirements on Positioning and Communication**
R. Kraemer
Workshop on Positioning, Navigation and Communication 2005 (WPNC'05), Hanover, March 17, 2005, Germany
- (14) **Am Anfang gab es nur eine Idee**
R. Kraemer
Workshop Science2Market-Tag, Frankfurt (Oder), November 02, 2005, Germany
- (15) **From RFID to Flexible Sensor Networks, Models, Concepts, and Architectures**
R. Kraemer
International Workshop on Radio Frequency Identification (RFID) and Wireless Sensors, Kanpur, November 11-13, 2005, India

- (16) **A Highly Integrated Gbit Communication System in the 60 GHz Band**
R. Kraemer
15th Meeting of the WWRF, Paris, December 08-09, 2005, France
- (17) **IHP – Europäisches Forschungs- und Innovationszentrum für drahtlose Kommunikation**
W. Mehr
Technologietag „Halbleiterelektronik und Informationstechnologie in Mitteldeutschland“, Berlin, June 15, 2005, Germany
- (18) **SiGe-Technologien für Schaltkreise und Systeme der drahtlosen Kommunikation**
W. Mehr
Forschungsseminar, TFH Wildau, December 2005, Germany
- (19) **IHP – Auf dem Weg zum europäischen Innovationszentrum**
W. Mehr
Workshop Science2Market-Tag, Frankfurt (Oder), November 02, 2005, Germany
- (20) **SiGe HBT Integration in CMOS for Radio Frequency Applications**
W. Mehr, B. Tillack, D. Knoll, B. Heinemann, H. Rücker
2nd Sino-German Symposium “The Silicon Age”, Cottbus, September 22, 2005, Germany
- (21) **Solid Phase Reaction Growth of Rare Earth Oxides**
H.-J. Müssig
ESF Exploratory Workshop on: Rare Earth Oxide Thin Films: Growth, Characterization and Applications, San Remo, May 11-13, 2005, Italy
- (22) **Dielectrics for Future Si-based Device Technology**
T. Schröder
International Max-Planck Research Summer School Interfaces of Oxides, Stuttgart, August 4-8, 2005, Germany
- (23) **Preparation and Properties of Heteroepitaxial Praseodymium Oxide Films on Si(001) and Si(111): Basic Research for Industrial Applications**
T. Schröder, P. Zaumseil, C. Wenger, G. Lippert, G. Lupina, H.-J. Müssig
Materialwissenschaftliches Seminar, Bremen, February 10, 2005, Germany
- (24) **Si-basierte Photovoltaik: Gegenwart und Zukunftsperspektiven**
W. Seifert, M. Kittler
Innovationstag Energie 2005, BTU Cottbus, June 01-02, 2005, Germany
- (25) **Atomically Controlled Processing for Si and SiGe Micro- and Nanotechnology**
B. Tillack, Y. Yamamoto, B. Heinemann, H. Rücker, D. Knoll, J. Murota
Nanoscience 2005, Lichtenwalde, October 05-08, 2005, Germany
- (26) **Atomic Layer Processing for Doping of SiGe**
B. Tillack, Y. Yamamoto, D. Bolze, B. Heinemann, H. Rücker, J. Murota, W. Mehr
1st International Workshop on New Group IV Semiconductor Nanoelectronics, Sendai, May 27-28, 2005, Japan
- (27) **Atomic Control of SiGe Epitaxy and Doping**
B. Tillack, Y. Yamamoto, K.-D. Bolze, H. Rücker, B. Heinemann, D. Knoll, D. Wolansky, J. Murota, W. Mehr
4th International Conference on Silicon Epitaxy and Heterostructures, Awaji Island, Hyogo, May 23-26, 2005, Japan
- (28) **60 GHz Circuits in SiGe HBT Technology**
W. Winkler
Compound Semiconductor IC Symposium (CSICS), Palm Springs, October 30, 2005, USA
- (29) **Millimeter-Wave Integrated Circuits in SiGe: C BiCMOS Technology**
W. Winkler
MWE 2005, Microwave Workshop and Exhibition 2005, Yokohama, November 09-11, 2005, Japan
- (30) **Impacts on Contact Resistance for 0.25 μm AI-BEOL**
D. Wolansky
Applied Materials PVD & MOCVD User Workshop, Dresden, May 11, 2005, Germany

Vorträge Presentations

- (1) **FTIR Study of Precipitation of Implanted Nitrogen in CZ-Si Annealed under High Hydrostatic Pressure**
V.D. Akhmetov, A. Misiuk, H. Richter
11th GADEST Conference, Giens, September 25-30, 2005, France
- (2) **FTIR Spectroscopic System with Improved Sensitivity**
V.D. Akhmetov, H. Richter
DRIP XI, Beijing, September 15-19, 2005, China
- (3) **Pressure – Induced Transformations of Nitrogen Implanted into Silicon**
V.D. Akhmetov, A. Misiuk, A. Barcz, H. Richter
2nd Sino-German Symposium "The Silicon Age", Cottbus, September 22, 2005, Germany
- (4) **Application of Photoluminescence for Silicon Materials Research**
T. Arguirov, M. Kittler, W. Seifert, X. Yu, M. Reiche
2nd Sino-German Symposium "The Silicon Age", Cottbus, September 22, 2005, Germany
- (5) **Untersuchungen am Wacker-Granalien-Block mit EBIC, DLTS und PL**
T. Arguirov, G. Jia, W. Seifert, M. Kittler
Arbeitstreffen ASIS-Verbundprojekt, Ochsenfurt, March 2005, Germany
- (6) **Silicon-based Light Emission Devices**
T. Arguirov, M. Kittler, W. Seifert, X. Yu
E-MRS Spring Meeting, Strasbourg, May 31 – June 03, 2005, France
- (7) **Spatially and Spectrally Resolved Photoluminescence for Characterization of Multicrystalline Silicon**
T. Arguirov, W. Seifert, G. Jia, M. Kittler
Arbeitstreffen ASIS-Verbundprojekt, Ochsenfurt, March 2005, Germany
- (8) **Optimization of Anti-reflective Coatings for Lithography Application**
J. Bauer, O. Fursenko, S. Virko, T. Grabolla, B. Kuck, V. Melnik, W. Mehr
21. European Mask and Lithography Conference EMLC, Dresden, January 31 - February 03, 2005, Germany
- (9) **Swing Curves: High NA Effect and Determination of Optical Constants**
J. Bauer, U. Haak, A. Woroniecki, M. Szuggars
TEL Process Seminar, Dresden, June 03, 2005, Germany
- (10) **Technologische Anwendungen von Excimer- und CO₂-Impulslasern**
H. Beyer, W. Roß, P. Schmidt
Laser in der Feinbearbeitung, Laserverbund Berlin-Brandenburg, Teltow, October 22, 2005, Germany
- (11) **Untersuchung zur Immobilisierung von Biomolekülen auf Halbleiteroberflächen mit der Methode der Röntgenreflektometrie**
M. Birkholz
Joint Lab der Brandenburgisch-Technischen Universität Cottbus, June 28, 2005, Germany
- (12) **Perspektiven zur Untersuchung von Biomaterialien durch Immobilisierung auf CMOS/BiCMOS-Höchstfrequenz-Bauteilen**
M. Birkholz
Fachbereich Physik der Freien Universität Berlin, June 13, 2005, Germany
- (13) **A Low-Power, 10 Gs/s Track-and-Hold Amplifier in SiGe BiCMOS Technology**
Y. Borokhovych, H. Gustat, B. Tillack, Y. Lu, B. Heinemann, W.-M. Lance Kuo, X. Li, R. Krithivasan, J.D. Cressler
ESSCIRC 2005, Grenoble, September 12-16, 2005, France
- (14) **ADS RFDE Simulation: An Overview**
P.K. Datta
4th Workshop High-Performance SiGe:C BiCMOS for Wireless, Tutorial, Frankfurt (Oder), September 22-23, 2005, Germany
- (15) **EUSAT – On Automotive Safety Technology – A Derived WINcell Middleware Application**
J. deMeer
Galileo Anwendungszentrum Berlin-Brandenburg – Technologiestiftung Berlin, July 25, 2005, Germany

- (16) Berichterstattung aus EU EUSAT Project Preparation**
J. deMeer
Technologiestiftung Innovationszentrum Berlin (TSB)
Workshop on Berlin-Prag-Wien-European Competence and Vision for Future Transport Technologies to IST, 7th Framework Programme, Berlin, July 28, 2005, Germany
- (17) Berichterstattung vom QoS-MW Workshop**
J. deMeer
IWQoS - Quality of Service Workshop 2005, Passau, June 21-23, 2005, Germany
- (18) Feature Demonstration of PLASMA – the IHP Mobile Business Platform**
J. deMeer
IWQoS - Quality of Service Workshop 2005, Passau, June 21-23, 2005, Germany
- (19) WINcell Projektberichterstattung**
J. deMeer
Meeting of BMBF Wachstumskern XML: City to the Topic: Plattform für Intelligente Kollaborationsportale PINK EADS Berlin, June 07, 2005, Germany
- (20) Berichterstattung vom GI Middlewareforum**
J. deMeer
Coordination Meeting of National GI Regional Group Chairs
Technical University of Brandenburg, Cottbus, June 02, 2005, Germany
- (21) Electronic Assistance for Automation Processing – Advances**
J. deMeer
EU STREP RESIDUAL 2nd Project Preparation Meeting, Berlin, May 03-04, 2005, Germany
- (22) Digital Rights Management**
J. deMeer
4th (Spring) Workshop of GI Regionalgruppe Berlin, Schutzrechte für Inhalte und Software, TU Berlin, April 12, 2005, Germany
- (23) Electronic Assistance for Automation Processing – Foundations**
J. deMeer
EU STREP RESIDUAL 1st Project Preparation Meeting, due to FP6-2002-IST-C, Berlin, January 31 - February 02, 2005, Germany
- (24) Berichterstattung aus Normungsprojekten**
J. deMeer
Regular Meeting DIN NI17.3 on Maschinenlesbare Reisedokumente, Berlin, February 08, 2005, Germany
- (25) Interdisziplinäre Entwicklung Interaktiver Mobiler Sensorsysteme**
J. deMeer
Graduiertenkolleg der TU Berlin, 2005, Germany
- (26) BASUMA – Body Area System for Ubiquitous Multimedia Application**
J.-P. Ebert, D. Dietterle
Treffen des Vereins Brandenburgischer Ingenieure und Wirtschaftler, June 02, 2005, Frankfurt (O.)
- (27) Potential and Limitation of Electron Holography in Si Research**
P. Formanek, M. Kittler
11th GADEST Conference, Giens, September 25-30, 2005, France
- (28) Measurement Errors in Phase Images due to Noise and Limited Resolution**
P. Formanek
Microscopy Conference, Davos, August 28 – September 02, 2005, Switzerland
- (29) Technology Monitoring for Quality Assurance**
T. Grabolla, P. Schley
4th Workshop High-Performance SiGe:C BiCMOS for Wireless, Frankfurt (Oder), September 21, 2005, Germany
- (30) Asynchronous Circuit Design Techniques: An Overview**
E. Grass
GALS Workshop, Humboldt Universität zu Berlin, January 21, 2005, Germany
- (31) Implementation Aspects of Gbit/s Communication Systems in the 60 GHz Band**
E. Grass, F. Herzel, M. Piz, Y. Sun, R. Kraemer
Wireless World Research Forum (WWRF) / WG5, San Diego, July 07-08, 2005, USA

- (32) **Enhanced GALS Techniques for Datapath Applications**
E. Grass, F. Winkler, M. Krstic, A. Julius, C. Stahl, M. Piz
PATMOS 2005, Leuven, September 20-23, 2005, Belgium
- (33) **Draft PHY Proposal for 60 GHz WPAN**
E. Grass, M. Piz, F. Herzel, R. Kraemer
IEEE 802.15 Meeting, Vancouver, November 2005, Canada
- (34) **Components for High-speed A/D Converters**
H. Gustat
4th Workshop High-Performance SiGe:C BiCMOS for Wireless, Frankfurt (Oder), September 21, 2005, Germany
- (35) **NOR/OR Register Based ECL Circuits for Maximum Data Rate**
H. Gustat, J. Borngräber
2005 IEEE Bipolar/BiCMOS Circuits and Technology (BCTM 2005), Santa Barbara, October 10-11, 2005, USA
- (36) **System-Level Simulation of a Noisy Phase-Locked Loop**
F. Herzel, M. Piz
35th European Microwave Conference 2005, Paris, October 03-04, 2005, France
- (37) **60 GHz Transceiver Components**
F. Herzel, M. Piz
4th Workshop High-Performance SiGe:C BiCMOS for Wireless, Frankfurt (Oder), September 21, 2005, Germany
- (38) **Frequency Synthesis for 60 GHz OFDM Systems**
F. Herzel, M. Piz, E. Grass
10th International OFDM Workshop, Hamburg, August 31 - September 1, 2005, Germany
- (39) **Annealing Behavior of New Nitrogen Infrared Absorption Peaks in Cz Silicon**
H. Inoue, M. Nakatsu, K. Tanahashi, H. Yamada-Kaneta, H. Ono, V.D. Akhmetov, O. Lysytskiy, H. Richter
11th GADEST Conference, Giens, September 25-30, 2005, France
- (40) **As-grown Defects in Germanium Studied by Brewster Angle LST and Etching**
G. Kissinger
2nd CADRES Germanium Workshop, Brussels, December 12, 2005, Belgium
- (41) **Oxygen Precipitation in Nitrogen Doped Silicon**
G. Kissinger, T. Müller, A. Sattler, U. Lambert, W. Häckl, M. Weber, A. Huber, P. Krottenthaler, H. Richter, W. von Ammon
11th GADEST Conference, Giens, September 25-30, 2005, France
- (42) **A Contribution to Oxide Precipitate Nucleation in Nitrogen Doped Silicon**
G. Kissinger, U. Lambert, M. Weber, F. Bittersberger, T. Müller, H. Richter, W. von Ammon
Oxford Meeting on Nitrogen in Silicon, December 08, 2005, UK
- (43) **Future Silicon Wafers**
G. Kissinger
Siltronic AG, Burghausen, December 16, 2005, Germany
- (44) **Combination of Optical Measurements and Precipitation Theory to Overcome the Obstacles of Detection Limits**
G. Kissinger, T. Müller, A. Sattler, W. Häckl, P. Krottenthaler, T. Grabolla, H. Richter, W. von Ammon
DRIP XI, Beijing, September 15-19, 2005, China
- (45) **Si Based Light Emitters**
M. Kittler
2nd Sino-German Symposium "The Silicon Age", Cottbus, September 22, 2005, Germany
- (46) **Dependence of Electrical and Optical Properties of Si on Defects and Impurities**
M. Kittler
SiWEDS Fall Meeting, Seoul, October 13-14, 2005, Korea
- (47) **Dislocation Engineering for a Silicon-Based Light Emitter at 1.5 μm**
M. Kittler, M. Reiche, T. Arguirov, W. Seifert, X. Yu
International Electron Devices Meeting (IEDM 2005), Washington, December 05-12, 2005, USA

- (48) **Si-Based Light Emission after Ion Implantation**
M. Kittler, T. Arguirov, A. Fischer, W. Seifert, X. Yu
3rd Optoelectronic and Photonic Winter School
Optical Interconnects, Trento, February 27 – March 04, 2005, Italy
- (49) **Silicon Based Light Emitters for On-Chip Optical Interconnects**
M. Kittler, T. Arguirov, W. Seifert, X. Yu, M. Reiche
11th GADEST Conference, Giens, September 25-30, 2005, France
- (50) **Arbeitsergebnisse des IHP und IHP/BTU Joint Lab zum ASiS-Projekt**
M. Kittler, W. Seifert, T. Arguirov, G. Jia, Q. Wie, O. Vyvenko
Arbeitsstreffen ASiS-Verbundprojekt, Ochsenfurt, September 2005, Germany
- (51) **Regular Dislocation Networks in Si as a Tool for Nanostructure Devices**
M. Kittler, X. Yu et al.
Optics East, SPIE-Symposium 6003, Boston, October 23-26, 2005, USA
- (52) **SiGe:C BiCMOS Technology Development for High Speed and Low Cost Applications**
D. Knoll
Philips Research Leuven, June 29, 2005, Belgium
- (53) **IHP's 0.25 μ m BiCMOS Technologies**
D. Knoll
4th Workshop High-Performance SiGe:C BiCMOS for Wireless, Frankfurt (Oder), September 21, 2005, Germany
- (54) **A Low-Cost SiGe:C BiCMOS Technology with Embedded Flash Memory and Complementary LDMOS Module**
D. Knoll, A. Fox, K.-E. Ehwald, B. Heinemann, R. Barth, A. Fischer, H. Rücker, P. Schley, R. Scholz, F. Korndörfer, B. Senapati, V.E. Stikanov, B. Tillack, W. Winkler, Ch. Wolf, P. Zaumseil
2005 IEEE Bipolar/BiCMOS Circuits and Technology (BCTM 2005), Santa Barbara, October 10-11, 2005, USA
- (55) **Integrating Mobile Devices into E-business Architectures: Open Issues and Potential Solutions**
R. Kraemer, P. Langendörfer
DECUS IT-Symposium 2005, Neuss, April 05, 2005, Germany
- (56) **Wireless Engines: Ein vertikales Verfahren zur Entwicklung neuer drahtloser Kommunikationssysteme**
R. Kraemer
University of Paderborn, June 07, 2005, Germany
- (57) **GALS Technique for Wireless Communication Systems**
M. Krstic
GALS Workshop, Humboldt Universität zu Berlin, January 21, 2005, Germany
- (58) **BIST Testing for GALS Systems**
M. Krstic, E. Grass
8th EUROMICRO Conference on Digital System Design – Architecture, Methods and Tools (DSD 2005), Porto, August 30- September 03, 2005, Portugal
- (59) **Request-driven GALS Technique for Wireless Communication System**
M. Krstic, E. Grass, C. Stahl
IEEE International Symposium on Asynchronous Circuits and Systems (ASYNC) 2005, New York, March 14-16, 2005, USA
- (60) **Schutz der Privatsphäre im mobilen Internet: Ein Systemansatz**
P. Langendörfer
TU Braunschweig, October 04, 2005, Germany
- (61) **Low Power Security Means: Key to Privacy in Context-aware Systems**
P. Langendörfer
Florida International University, Miami, 2005, USA
- (62) **Schutz der Privatsphäre im Wireless Internet**
P. Langendörfer
Marie-Curie-Gymnasium Wittenberge, November 04, 2005, Germany

- (63) Privacy and Convenient Up Time of Mobile Devices: An Antagonism?**
P. Langendörfer
Research Trends in Science and Technology (RTST 2005), Beirut, March 07, 2005, Lebanon
- (64) More Privacy in Context-aware Platforms: User Controlled Access Right Delegation Using Kerberos**
P. Langendörfer, K. Piotrowski
4th WSEAS International Conference on Information Security, Communications and Computers (ISCO-CO 2005), Puerto De La Cruz, December 16-18, 2005, Spain
- (65) Charged Location Aware Services**
P. Langendörfer, K. Piotrowski, M. Maaser
4th International Conference on Mobile Business (ICMB 2005), Sydney, July 11-13, 2005, Australia
- (66) Implementation Independent Profiling of SDL Specifications**
P. Langendörfer, M. Lehmann
Software Engineering, Essen, March 08-11, 2005, Germany
- (67) Area Efficient Hardware Implementation of Elliptic Curve Cryptography by Iteratively Applying Karatsuba's Method**
P. Langendörfer, Z. Dyka
Design Automation and Test 2005 (DATE 2005), München, March 07-11, 2005, Germany
- (68) Advanced Activation of Ultra-Shallow Junctions Using Flash-assisted RTP**
W. Lerch, S. Paul, J. Niess, S. McCoy, T. Selinger, J. Gelpey, F. Cristiano, F. Severac, M. Govelle, S. Boninelli, P. Pichler, D. Bolze
E-MRS Spring Meeting 2005, Strasbourg, May 31 – June 03, 2005, France
- (69) Advanced Activation of Ultra-Shallow Junctions Using Flash-assisted RTP**
W. Lerch, S. Paul, J. Niess, S. McCoy, T. Selinger, J. Gelpey, F. Cristiano, F. Severac, M. Govelle, S. Boninelli, P. Pichler, D. Bolze
18. Treffen der Nutzergruppe RTP, Reutte, November 10, 2005, Austria
- (70) Is the IEEE 802.11 MAC Layer Suitable for Car-to-Car Communication?**
W. Lohmann, J.-P. Ebert, M. Grade, A. Lübke, R. Kraemer
1st Workshop on Wireless Vehicular Communications and Services for Breakdown Support and Car Maintenance (W-CarsCare'05), Nicosia, April 10, 2005, Cyprus
- (71) A 8-bit, 12 GSAMPLE/sec SiGe TRACK-AND-HOLD AMPLIFIER**
Y. Lu, W.-M. L. Kuo, X. Li, R. Krithivasan, J.D. Cressler, Y. Borokhovych, H. Gustat, B. Tillack, B. Heinemann
2005 IEEE Bipolar/BiCMOS Circuits and Technology (BCTM 2005), Santa Barbara, October 10-11, 2005, USA
- (72) Titanium Added Praseodymium Silicate Layers on Si(001) for High-k Dielectrics Applications**
G. Lupina, J. Dabrowski, T. Schröder, C. Wenger, G. Lippert, A. Mane, R. Sorge, G. Weidner, H.-J. Müssig, D. Schmeißer
69. Annual Meeting of the DPG, Berlin, March 04-09, 2005, Germany
- (73) Praseodymium Silicate Layers for High-k Dielectric Applications – Physical and Electrical Characterization**
G. Lupina, T. Schröder, J. Dabrowski, C. Wenger, A. Mane, G. Lippert, H.-J. Müssig
MIGAS International Summer School on Advanced Microelectronics, Autrans, June 11-17, 2005, France
- (74) Automated Negotiation of Privacy Contracts**
M. Maaser, P. Langendörfer
The 29th Annual International Computer Software and Applications Conference, Edinburgh, July 25-28, 2005, UK
- (75) An Efficient Strategy of Processing Distributed Location Based Events**
O. Maye
IEEE International Conference on Pervasive Services 2005 (ICPS'05), Santorini, July 11-14, 2005, Greece

- (76) **Formation and Properties of Iron-Phosphorus and Iron-Phosphorus-Hydrogen Complexes in Silicon**
T. Mchedlize
11th GADEST Conference, Giens, September 25-30, 2005, France
- (77) **Novel Si Technologies – New Defects. How to Study them with Traditional Methods?**
T. Mchedlize
Technical University of Brandenburg, Cottbus, April 05, 2005, Germany
- (78) **Spin Resonance Related to Defects in Silicon: New Defects and New Technique**
T. Mchedlize
Hahn-Meitner-Institute, Berlin, July 06, 2005, Germany
- (79) **SiGe Technology for Radio Frequency Applications**
W. Mehr
German-Russian Workshop on SiGe BiCMOS Technologies and Circuits, Moscow, November 24, 2005, Russia
- (80) **The Impact of Channel Engineering on the Performance and Reliability of LDMOS Transistors**
N.R. Mohapatra, K.-E. Ehwald, R. Barth, H. Rücker, D. Bolze, P. Schley, D. Schmidt, H.-E. Wulf
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- (81) **Precipitation Enhancement of so Called Defect-Free Czochralski Silicon Material**
T. Müller, G. Kissinger, P. Krottenthaler, C. Seuring, R. Wahlich, W. von Ammon
11th GADEST Conference, Giens, September 25-30, 2005, France
- (82) **Atomically Controlled CVD Technology for Future Si-based Devices**
J. Murota, M. Sakuraba, B. Tillack
207th Electrochemical Society Meeting, Quebec, May 15-20, 2005, Canada
- (83) **Design of Wireless Systems Utilizing Scratchpad Memories**
G. Panic, Z. Stamenkovic, K. Tittelbach-Helmrich, J. Lehmann, G. Schoof
IP Based SoC Design (IP-SOC 2005), Grenoble, December 07-08, 2005, France
- (84) **Effect of Fluorine on the Activation and Diffusion Behaviour of Boron Implanted Preamorphized Silicon**
S. Paul, W. Lerch, B. Colombeau, N.E.B. Covern, F. Christiano, S. Boninelli, D. Bolze
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- (85) **Effect of Fluorine on the Activation and Diffusion Behaviour of Preamorphized Silicon**
S. Paul, W. Lerch, B. Colombeau, N.E.B. Covern, F. Christiano, S. Boninelli, D. Bolze
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- (86) **Charged Location Aware Services**
K. Piotrowski, P. Langendörfer, M. Maaser, G. Spichal, P. Schwander
4th International Workshop on Wireless Information Systems (WIS-2005), Miami, May 24-28, 2005, USA
- (87) **Si/SiGe Double Barrier Resonant Tunneling Diode**
P. Racec, U. Wulf, G. Kissinger, H. Richter
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- (88) **Silicon Wafer Bonding Using Deposited and Thermal Oxide: A Comparative Study**
I. Radu, R. Singh, M. Reiche, B. Kuck, T. Grabolla, U. Gösele, B. Tillack, S. Christiansen
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- (89) **Silicon Wafer Bonding Using Various Oxide Layers: PE TEOS Versus Thermal Oxide**
I. Radu, R. Singh, S. Christiansen, M. Reiche, U. Gösele, B. Kuck, T. Grabolla, B. Tillack
207th Electrochemical Society Meeting, Quebec, May 15-20, 2005, Canada

- (90) **Plasma Etching of Carbon Hard Mask Stacks for Sub-100 nm Technologies**
H.H. Richter, K.A. Pears, M. Markert, S. Günther, S. Marschmeyer, H. Silz, G. Weidner, H. Kirmse, W. Neumann
12. Bundesdeutsche Fachtagung Plasmatechnologie, Braunschweig, March 21-23, 2005, Germany
- (91) **0.13 μm BiCMOS Development**
H. Rücker
4th Workshop High-Performance SiGe:C BiCMOS for Wireless, Frankfurt (Oder), September 21, 2005, Germany
- (92) **SiGe BiCMOS Technology**
H. Rücker
German-Russian Workshop on SiGe BiCMOS Technologies and Circuits, Moscow, November 24, 2005, Russia
- (93) **Circuit Design in SiGe BiCMOS Technology**
K. Schmalz
German-Russian Workshop on SiGe BiCMOS Technologies and Circuits, Moscow, November 24, 2005, Russia
- (94) **A Class AB 6th Order Log-Domain Filter in BiCMOS with 100-500 MHz Tuning Range**
K. Schmalz, M.A. Teplechuk, J.I. Sewell
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- (95) **MPW and Prototyping Service**
R.F. Scholz
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- (96) **MPW and Foundry Service**
R.F. Scholz
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- (97) **Materialien für die Mikroelektronik – auf Entdeckungsreise im Nanokosmos**
T. Schröder
Tag der offenen Tür, IHP Frankfurt (Oder), September 03, 2005, Germany
- (98) **Von der Mikro- zur Nanoelektronik: Eine Herausforderung an moderne Materialien**
T. Schröder
Verein Brandenburgischer Ingenieure und Wirtschaftler e.V. und des Elektrotechnischen Vereins e.V. Frankfurt (Oder), October 13, 2005, Germany
- (99) **Lattice Matching Approaches for High Quality S-I-S Structures**
T. Schröder
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- (100) **Epitaxial Silicon/Praseodymium Oxide/Silicon Heterostructures: Lattice Matching Approaches for Alternative SOI Structures**
T. Schröder, H.-J. Müssig
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- (101) **Heteroepitaxial Silicon/ Pr_2O_3 /Silicon Sandwich Structures for Nanoelectronics Applications**
T. Schröder, P. Zaumseil, C. Wenger, G. Lippert, G. Lupina, H.-J. Müssig, L. Libralesso, J. Zegenhagen
DPG Frühjahrstagung, Berlin, March 04-09, 2005, Germany
- (102) **Growth, Structure and Electric Properties of Epitaxial Si/ Pr_2O_3 /Si₃(111) Heterostructures**
T. Schröder, P. Zaumseil, G. Weidner, C. Wenger, G. Lippert, A. Mane, J. Dabrowski, H.-J. Müssig
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- (103) **Modern X-Ray Diffraction Techniques for Technology Relevant Materials Systems: The Example of Ultra-Thin Praseodymium Oxide Layers on Silicon for Nanoelectronics Applications**
T. Schröder, P. Zaumseil
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(104) Hazard Detection in GALS Wrapper: A Case Study

C. Stahl, W. Reisig, M. Krstic

5th Int. Conf. on Application of Currency to System Design (ACSD 2005), St. Malo, June 06-09, 2005, France**(105) ADS Stand Alone Design Kit**

Y. Sun

4th Workshop High-Performance SiGe:C BiCMOS for Wireless, Tutorial, Frankfurt (Oder), September 22-23, 2005, Germany**(106) A Fully Integrated 60 GHz LNA in SiGe:C BiCMOS Technology**

Y. Sun, J. Borngräber, F. Herzel, W. Winkler

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(107) IHP Technology Development – Status and Overview

B. Tillack

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(108) High-Performance SiGe:C BiCMOS for Wireless and Broadband Communication: Technology, MPW and Prototyping, Applications: Introduction

B. Tillack

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O.F. Vyvenko, M. Kittler, W. Seifert

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G. Wang, R. Kraemer

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L. Wang, J. Borngräber, G. Wang, Z. Gu, A. Thiede

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(112) High Performance PrTiO_{3-x} MIM Capacitors for RF Applications

C. Wenger, R. Sorge, A. Mane, T. Schröder,

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(113) MIM Capacitors Using Amorphous High-k PrTiO_{x,y} Dielectrics

C. Wenger, R. Sorge, T. Schröder, A.U. Mane,

G. Lippert, G. Lupina, J. Dabrowski, P. Zaumseil,

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(114) Radar Circuits

W. Winkler

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(116) A Fully Integrated BiCMOS PLL for 60 GHz Wireless Applications

W. Winkler, J. Borngräber, B. Heinemann, F. Herzel

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(117) Chemical Vapor Phase Etching of Polycrystalline Selective to Epitaxial SiGe

Y. Yamamoto, B. Tillack, K. Köpke, O. Fursenko

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- (118) P Doping Control During SiGe:C Epitaxy**
Y. Yamamoto, B. Tillack, K. Köpke, R. Kurps
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- (119) Silicon Light Emitting Diodes Prepared by Ion Implantation**
Y. Yeromenko, T. Arguirov, M. Kittler, W. Seifert, J. Reif
69. Jahrestagung der DPG-Halbleiterphysik, Berlin, March 04-09, Germany
- (120) Properties of Dislocation Networks Formed by Si Wafer Direct Bonding**
X. Yu, T. Arguirov, M. Kittler, W. Seifert, M. Ratzke, M. Reiche
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- (121) Tutorial: High Resolution X-Ray Diffraction**
P. Zaumseil
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- (122) Structural Characterization of Epitaxial Si/Pr₂O₃/Si(111) Heterostructures**
P. Zaumseil, T. Schröder, G. Weidner
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- (3) Ab initio Investigation of Pr-Related Dielectrics for CMOS Technology**
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- (4) Ab Initio Investigation of High-k Dielectrics for CMOS Technology Development**
J. Dabrowski, A. Fleszar
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- (5) Tragfähige Architekturenprinzipien**
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- (6) Spezifikation der Anwendung (final)**
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- (7) BASUMA Teilvorhaben, Gesamtarchitektur, Protokollstapel und Digitalteil der IMC**
J.-P. Ebert
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- (8) Präsentation der IHP-Technologie und des Projektstatus**
G.G. Fischer
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- (9) A VCO with Output Buffer for 77 GHz Automotive Radar**
S. Glisic
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- (10) Intermediate Report**
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- (11) Final Report**
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- (12) Evaluation of the Feasibility of Flow Pattern Defect Etching of Germanium**
G. Kissinger
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- (1) Spatially and Spectrally Resolved Photoluminescence for Characterization of Multicrystalline Silicon**
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- (2) Untersuchungen am Wacker-Granalien-Block mit EBIC, DLTS und PL**
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- (13) **Arbeitsergebnisse des IHP und IHP/BTU JointLab zum ASIS-Projekt**
M. Kittler, W. Seifert, T., Arguirov, G. Jia, Q. Wei, O. Vyvenko
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