



Volume 507

1 February 2019

ISSN 0022-0248

**JOURNAL OF CRYSTAL
GROWTH**

EDITORS:

T.F. KUECH (Principal Editor),
University of Wisconsin at Madison

R.S. FEIGELSON, Stanford University

K. NAKAJIMA, Tohoku University

G.B. STRINGFELLOW,
The University of Utah

FOUNDING EDITOR: M. SCHIEBER[†]

CO-FOUNDERS: N. CABRERA, B. CHALMERS,
F.C. FRANK

FORMER ADVISOR: R.A. LAUDISE[†]

Available online at www.sciencedirect.com

ScienceDirect



ELSEVIER

IH 549LB001

000311A

CRYSTAL
GROWTH

Abstracted/Indexed in: Aluminium Industry Abstracts; Chemical Abstracts; Current Contents: Physical, Chemical and Earth Sciences; Compendex Plus; Engineered Materials Abstracts; Engineering Index; INSPEC; Metals Abstracts. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®.

CONTENTS

Classical semiconductors

Ternary $\text{Pb}_{1-x}\text{Cd}_x\text{Se}$ films grown by molecular beam epitaxy on GaAs/ZnTe hybrid substrates
S. Chusnutdinow, M. Szot, S. Schreyeck,
M. Aleszkiewicz, I.V. Kucherenko, A.V. Muratov,
V.A. Yakovlev, T. Wojtowicz and G. Karczewski

10

Molecular beam epitaxy and characterization of AlGaIn nanowire ultraviolet light emitting diodes on Al coated Si (0 0 1) substrate
Y. Wu, Y. Wang, K. Sun and Z. Mi

65

X-ray diffraction on stacking faults in 3C-SiC epitaxial microcrystals grown on patterned Si (0 0 1) wafers
M. Meduňa, T. Kreiliger, M. Mauceri, M. Puglisi,
F. Mancarella, F. La Via, D. Crippa, L. Miglio and
H.v. Känel

70

In-situ measurement of CO gas concentration in a Czochralski furnace of silicon crystals
Y. Miyamura, H. Harada, X. Liu, S. Nakano,
S. Nishizawa and K. Kakimoto

154

Dependence of optimum V/III ratio on substrate orientation, and influence of buffer layer on MOVPE grown InSb/GaSb quantum dots
C.C. Ahia, N. Tile and J.R. Botha

157

Study of indium and antimony incorporation into SnS_2 single crystals
A.J. Khimani, S.H. Chaki, M.P. Deshpande and
J.P. Tailor

180

Influence of the growth conditions of LT- AlN on quality of HT- AlN growth on Si (1 1 1) by metalorganic chemical vapor deposition
M.Y. Chernykh, I.S. Ezubchenko, I.O. Mayboroda
and M.L. Zhanavskina

200

Buried defects induced by plasma assisted molecular beam epitaxy of AlN and GaN on Silicon
Y. Cordier, R. Comyn, O. Tottereau, E. Frayssinet,
M. Portail and M. Nemoz

220

The influence of travelling magnetic field on phosphorus distribution in n-type multi-crystalline silicon
I. Buchovska, N. Dropka, S. Kayser and
F.M. Kiessling

299

Advantage of heteroepitaxial GaSb thin-film buffer and GaSb dot nucleation layer for $\text{GaSb}/\text{AlGaSb}$ multiple quantum well structure grown on Si (1 0 0) substrate by molecular beam epitaxy
R. Machida, K. Akahane, I. Watanabe, S. Hara,
S. Fujikawa, A. Kasamatsu and H.I. Fujishiro

357

Structural characteristics of m-plane AlN substrates and homoepitaxial films
M. Bobea Graziano, I. Bryan, Z. Bryan, R. Kirste,
J. Tweedie, R. Collazo and Z. Sitar

389

Assessing epitaxial regrowth material quality on a micro-transfer printed GaAs substrate
K.J. Schmieder, M.P. Lumb, M.F. Bennett,
C.R. Haughn, S. Mack, M.K. Yakes, S.I. Maximenko
and R.J. Walters

402

Solution growth; industrial biological and molecular crystallization

Effects of succinic acid and adipic acid on the metastable width of glutaric acid in acetic acid
Y. Huang, J. Lu, H. Chen, W. Du and X. Wang

1

The effect of solution conditions on the crystal morphology of β -HMX by molecular dynamics simulations
J. Li, S. Jin, G. Lan, Z. Xu, N. Wu, S. Chen and L. Li

38

Habit prediction of 3,4,5-trinitro-1H-pyrazole in four solvent mediums using a molecular dynamics simulation
L. Chen, C. She, H. Pan, J. Wang and D. Cao

58

Kinetics of plaster hydration and structure of gypsum: Experiments and kinetic Monte Carlo simulations with added gypsum seeds
G. Morgado, L. Masurel, Z. Rhodes, R. Lespiat,
H. Rétot and A. Lemarchand

124

Contents continued on inside back cover



A kinetic study of crystallization process of imatinib mesylate with polymorphic transformation phenomenon M. Lin, Y. Wu and S. Rohani	146	Compensation effects of high oxygen levels in semipolar AlGaIn electron blocking layers and their mitigation via growth optimization D.L. Becerra, D.A. Cohen, S. Mehari, S.P. DenBaars and S. Nakamura	118
Synthesis of high purity ammonium alum crystallized from solutions containing impurities S. You, T. Guo, P. Liu, X. Mao, Y. Zhang and Y. Zhang	168	Molecular beam epitaxy growth of $\text{Mn}_{4-x}\text{Ni}_x\text{N}$ thin films on MgO(0 0 1) substrates and their magnetic properties T. Komori, A. Anzai, T. Gushi, K. Toko and T. Suemasu	163
Effects of 6H-SiC substrate polarity on the morphology and microstructure of AlN films by HVPE with varied V/III ratio J.J. Chen, X.J. Su, J. Huang, M.T. Niu and K. Xu	196	Determination of the phase relation of a $\text{Li}_x\text{La}_{(1-x)/3}\text{NbO}_3$ system by the slow cooling floating zone method I. Tanaka, R. Yoshihara, C. Nakazawa, M. Nagao and S. Watauchi	251
The impact of sulfite ions on barium sulfate crystallization F. Jones, M.I. Ogden and T. Radomirovic	213	Effect of buffer layer structure on the structural properties of GaAs epitaxial layers grown on GaP substrates M. Imaizumi, M. Hirotsu, T. Soga and M. Umeno	288
Secondary nucleation and growth kinetics of aluminum hydroxide crystallization from potassium aluminate solution J. Xue, C. Liu, M. Luo, M. Lin, Y. Jiang, P. Li, J. Yu and S. Rohani	232	Understanding Al incorporation into 4H-SiC during epitaxy G. Ferro, D. Chaussende and N. Tsavdaris	338
The effect of crystal-solvent interaction on crystal growth and morphology J.-W. Li, S.-H. Zhang, R.-J. Gou, G. Han and M.-H. Chen	260	Isomorphous substitutions in sillenite-family single-crystal $\text{Bi}_{12}(\text{M}_{2-x}\text{Mn}^{4+})\text{O}_{20}$ solid solutions ($\text{M} = \text{Al}^{3+}, \text{Fe}^{3+}, \text{Ge}^{4+}, \text{Ti}^{4+}, \text{Cr}^{4+}, \text{V}^{5+}$) G.M. Kuz'micheva, T.I. Mel'nikova, I.A. Kaurova, Y.V. Zubavichus and V.I. Nikolaychik	413
The role of higher coformer stoichiometry ratio in pharmaceutical cocrystals for improving their solid-state properties: The cocrystals of progesterone and 4-hydroxybenzoic acid M. Samipillai and S. Rohani	270	General subjects	
Characteristics of aluminum nitride films on hexagonal boron nitride buffer layers using various growth methods through metal organic chemical vapor deposition M. Han, B.D. Ryu, K.B. Ko, C.H. Jo, C.-h. Lim, T.V. Cuong, N. Han and C.-H. Hong	316	Scintillation properties and increased vacancy formation in cerium and calcium co-doped yttrium aluminum garnet P.T. Dickens, D.T. Haven, S. Friedrich and K.G. Lynn	16
Continuous crystallization of α -form L-glutamic acid in an MSMR-Tubular crystallizer system Z. Gao, Y. Wu, J. Gong, J. Wang and S. Rohani	344	$\text{Na}_2\text{Mo}_2\text{O}_7$ scintillating crystals: Growth, morphology and optical properties V.D. Grigorjeva, V.N. Shlegel, N.V. Ivannikova, T.B. Bekker, A.P. Yelisseyev and A.B. Kuznetsov	31
Uniformly valid asymptotic solutions of rod eutectic growth in directional solidification for liquid-solid interface slopes of small order X.-M. Li, X.-K. Chen and F. Xu	453	Numerical simulation of heat and mass transfer during Czochralski silicon crystal growth under the application of crystal-crucible counter- and iso-rotations T.H.T. Nguyen, J.C. Chen, C. Hu and C.H. Chen	50
Electronic materials		Molecular beam epitaxy and characterization of $\text{Al}_{0.6}\text{Ga}_{0.4}\text{N}$ epilayers D.A. Laleyan, X. Liu, A. Pandey, W.J. Shin, E.T. Reid, K. Mashooq, M. Soltani and Z. Mi	87
Investigation on $\text{Cd}_{1-x}\text{Mn}_x\text{Te}$ grown by traveling heater method with redissolution process and Te inclusions on carrier transport uniformity of detector H. Shi, J. Zhang, L. Ling, S. Zhao, J. Min, X. Liang, J. Huang, K. Tang and L. Wang	23	Epitaxial lateral overgrowth of GaN on nano-cavity patterned sapphire substrates D. Lee, S. Lee, G. Kim, J. Kim, J. Jang, J. Oh, D. Moon, Y. Park and E. Yoon	103
Improved performance of mid-infrared superlattice light emitting diodes grown epitaxially on silicon A.J. Muhowski, C.L. Bogh, R.L. Heise, T.F. Boggess and J.P. Prineas	46	Hydrothermal synthesis of aluminum-doped zincophosphate large single crystal with different morphology W.T. Shi, D.L. Sun, J.Q. Chen, L. Sun, S.W. Chu, Z. Xi, Y.-J. Zeng, X.T. Xu and S.C. Ruan	189
Homoepitaxy of Ge on ozone-treated Ge (1 0 0) substrate by ultra-high vacuum chemical vapor deposition J. Wang, L. Shen, G. Lin, J. Wang, J. Xu, S. Chen, G. Xiang and C. Li	113	Growth of PrCo_2 single crystals with a Boron Nitride crucible Y. Liu, Q. Lin, A.K. Pathak, D. Paudyal and T.A. Lograsso	209

Influence of quartz on silicon incorporation in HVPE grown AlN S. Fleischmann, E. Richter, A. Mogilatenko, M. Weyers and G. Tränkle		
Growth and fluorescence characteristics of Er:LuAG laser crystals J. Quan, X. Yang, S. Long, M. Yang, D. Ma, J. Huang, Y. Guo, Y. Zhu and B. Wang		
Morphology of diamond single crystals grown in the Fe-Co-Mg-C system T.V. Kovalenko, V.V. Lysakovskiy, V.M. Kvasnytsya, S.O. Ivakhnenko, O.M. Suprun and A.V. Burchenia		
Growth and characterization of Cs ₂ LiLaCl ₆ :Ce single crystals H. Zhu, P. Zhang, S. Pan, H. Li, Y. Jiang, J. Zhang, Z. Zhang, G. Ren, J. Pan and H. Chen		
Crystallization of the polymer induced liquid mineral precursor in the constraint nanopores Y. Li, J. Zhu, M. Cui, J. Wang and J. Zha		
Initial stages of the epitaxial growth of AlN on GaN (1 1 1)-(2 × 2) surface: Ab-initio studies J.C. Moreno, J.H. Camacho-Garcia, R. Ponce-Pérez, F. Sánchez-Ochoa, M.T. Romero de la Cruz and G.H. Cocoletzi		
Study on the growth kinetics of Al ₂ O ₃ columnar crystal in Al ₂ O ₃ matrix composite ceramics prepared by microwave sintering C. Lü, Y. Ai, Q. Yu, W. Chen, W. He, J. Zhang and X. Min		
Laser-diode-heated floating-zone crystal growth of ErVO ₃ P. Telang, A. Maljuk, D. Rout, R. Hu, M. Skoulatos, K. Karmakar, S. Seiro, B. Roessli, U. Stühr, B. Büchner, S.-W. Cheong and S. Singh		
Post-solidification effects in directionally solidified ternary eutectic Al-Ag ₂ Al-Al ₂ Cu P. Steinmetz, S. Gadkari and A. Genau		
Errata		
Erratum to "Selective crystal growth of polymorphs and crystal-to-crystal thermal phase transition of non-peripherally alkyl-substituted phthalocyanine and tetrabenzotriazaporphyrin" [Journal of Crystal Growth 468(2017)804–809] M. Ohmori, C. Nakano, A. Fujii, Y. Shimizu and M. Ozaki		
VSI: CRYG_ACCGE-21/OMVPE-18		
Understanding and controlling Ga contamination in InAlN barrier layers M. Mrad, M. Charles, Y. Mazel, E. Nolot, J. Kanyandekwe, M. Veillerot, P. Ferret and G. Feuillet		
VSI: IWBNS-X		
Physical properties of Ga-Fe-N system relevant for crystallization of GaN – Initial studies B. Sadovyi, P. Sadovyi, I. Petrusha, I. Dziecielewski, S. Porowski, V. Turkevich, A. Nikolenko, B. Tsykaniuk, V. Strelchuk and I. Grzegory	77	
VSI: CRYG_ICMOVPE-XIX		
MOVPE grown GaInAsP/GaInAsP SCH-MQW laser diode on directly-bonded InP/Si substrate H. Sugiyama, K. Uchida, X. Han, G.K. Periyanyagam, M. Aikawa, N. Hayasaka and K. Shimomura	295	93
Design evolution of MOVPE reactors for improved productivity: Adaptation to nitrides and feedback to classical III-V K. Matsumoto, A. Ubukata, P. Guanxi, Y. Yano, T. Tabuchi, S. Koseki, H. Sodabanlu, K. Watanabe, Y. Nakano and M. Sugiyama	321	
How to obtain metal-polar untwinned high-quality (1 0 -1 3) GaN on m-plane sapphire N. Hu, D.V. Dinh, M. Pristovsek, Y. Honda and H. Amano	327	134
Selective-area growth of magnetic MnAs nanodisks on Si (1 1 1) substrates using multiple types of dielectric masks R. Horiguchi, S. Hara, M. Iida and K. Morita	332	205
Magnetization characterization of MnAs nanoclusters at close range in bended MnAs/InAs heterojunction nanowires R. Kodaira, R. Horiguchi and S. Hara	362	226
Influence of GaN buffer layer under InGaN/GaN MQWs on luminescent properties F. Dominec, A. Hospodková, T. Hubáček, M. Zíková, J. Pangráč, K. Kuldová, A. Vetushka and E. Hulicius	370	241
Highly tin doped GaAs at low growth temperatures using tetraethyl tin by metal organic vapor phase epitaxy O. Elleuch, K. Lekhal, Y. Guan and T.F. Kuech	395	246
Improved crystal quality of semipolar AlN by employing a thermal annealing technique with MOVPE M. Jo, Y. Itokazu, S. Kuwaba and H. Hirayama	406	255
Strong suppression of In desorption from InGaN QW by improved technology of upper InGaN/GaN QW interface T. Hubáček, A. Hospodková, J. Oswald, K. Kuldová, J. Pangráč, M. Zíková, F. Hájek, F. Dominec, N. Florini, Ph. Komninou, G. Ledoux and C. Dujardin	425	307
MOVPE van der Waals epitaxial growth of AlGaN/AlGaN multiple quantum well structures with deep UV emission on large scale 2D h-BN buffered sapphire substrates S. Sundaram, X. Li, S. Alam, T. Ayari, Y. Halfaya, G. Patriarche, P.L. Voss, J.P. Salvestrini and A. Ougazzaden	459	310
Epitaxial growth of undoped and Li-doped NiO thin films on α-Al ₂ O ₃ substrates by mist chemical vapor deposition T. Ikenoue, J. Inoue, M. Miyake and T. Hirato	499	379
Atomic step-flow epitaxy of low defect InGaAs islands on Si(1 1 1) by micro-channel selective area MOVPE Y. Fu, N. Otake, Y. Tachino, T. Watanabe and M. Sugiyama		384

First-principle study of ammonia decomposition and nitrogen incorporation on the GaN surface in metal organic vapor phase epitaxy K.M. Bui, J.-I. Iwata, Y. Kangawa, K. Shiraishi, Y. Shigeta and A. Oshiyama	421	Effect of growth rate on morphology evolution of 4H-SiC thick homoepitaxial layers Y. Niu, X. Tang, P. Wu, L. Kong, Y. Li, J. Xia, H. Tian, L. Tian, L. Tian, W. Zhang, R. Jia, F. Yang, J. Wu, Y. Pan and Y. Zhang	143
Fabrication of submicron active-region-buried GaN hexagonal frustum structures by selective area growth for directional micro-LEDs N. Kumagai, T. Takahashi, H. Yamada, G. Cong, X.-L. Wang and M. Shimizu	437	The influence of growth temperature on 4H-SiC epilayers grown on different off-angle (0001) Si-face substrates G.G. Yan, X.F. Liu, Z.W. Shen, W.S. Zhao, L. Wang, Y.X. Cui, J.T. Li, F. Zhang, G.S. Sun and Y.P. Zeng	175
VSI: APCSCRM2018			
Growth and characterization of nitrogen-phosphorus hybrid passivated gate oxide film on N-type 4H-SiC epilayer Y. Jia, H. Lv, X. Tang, C. Han, Q. Song, Y. Zhang, Y. Zhang, S. Dimitrijevic and J. Han	98	Homoepitaxial growth of multiple 4H-SiC wafers assembled in a simple holder via conventional chemical vapor deposition X.F. Liu, G.G. Yan, Z.W. Shen, Z.X. Wen, J. Chen, Y.W. He, W.S. Zhao, L. Wang, M. Guan, F. Zhang, G.S. Sun and Y.P. Zeng	283
A correlation study of substrate and epitaxial wafer with 4H-N type silicon carbide L. Zhao and H. Wu	109	Development of high power SiC devices for rail traction power systems G. Liu, Y. Wu, K. Li, Y. Wang and C. Li	442