

Contents

Part I Lateral Self-Alignment

I.1 General

1 Physical Mechanisms of Self-Organized Formation of Quantum Dots

V. Shchukin, D. Bimberg..... 5

2 Routes Toward Lateral Self-Organization of Quantum Dots: the Model System SiGe on Si(001)

C. Teichert, M.G. Lagally..... 49

I.2 Compact Lateral Quantum Dot Configurations

3 Short-Range Lateral Ordering of GeSi Quantum Dots Due to Elastic Interactions

J.A. Floro, R. Hull, J.L. Gray..... 79

4 Hierarchical Self-Assembly of Lateral Quantum-Dot Molecules Around Nanoholes

A. Rastelli, R. Songmuang, S. Kiravittaya, O.G. Schmidt 103

I.3 Ordering in Single Layers

5 Energetics and Kinetics of Self-Organized Structure Formation in Solution Growth – the SiGe/Si System

S.H. Christiansen, M. Schmidbauer, H. Wawra, R. Schneider, W. Neumann, H.P. Strunk 127

6 Ge Quantum Dot Self-Alignment on Vicinal Substrates

I. Berbezier, A. Ronda, A. Karmous..... 195

7 Lateral Arrangement of Ge Self-Assembled Quantum Dots on a Partially Relaxed $\text{Si}_x\text{Ge}_{1-x}$ Buffer Layer

H.-j. Kim, Y.-H. Xie, K.L. Wang..... 209

8 Ordering of Wires and Self-Assembled Dots on Vicinal Si and GaAs (110) Cleavage Planes <i>G. Abstreiter, D. Schuh</i>	229
---	-----

I.4 Ordering by Layer Stacking

9 Stacking and Ordering in Self-Organized Quantum Dot Multilayer Structures <i>G. Springholz, V. Holy</i>	247
---	-----

10 Self-Organized Anisotropic Strain Engineering for Lateral Quantum Dot Ordering <i>R. Nötzel</i>	305
--	-----

11 Towards Quantum Dot Crystals via Multilayer Stacking on Different Indexed Surfaces <i>Z.M. Wang, G.J. Salamo</i>	325
---	-----

Part II Forced Alignment

II.5 Growth on Shallow Modulated Surfaces

II.5.1 SiGe Islands

12 One-, Two-, and Three-Dimensionally Ordered GeSi Islands Grown on Prepatterned Si (001) Substrates <i>Z. Zhong, G. Bauer, O.G. Schmidt</i>	353
---	-----

13 Ordered SiGe Island Arrays: Long Range Material Distribution and Possible Device Applications <i>G.S. Kar, S. Kiravittaya, M. Stoffel, O.G. Schmidt</i>	373
--	-----

14 Nanoscale Lateral Control of Ge Quantum Dot Nucleation Sites on Si(001) Using Focused Ion Beam Implantation <i>A. Portavoce, R. Hull, F.M. Ross</i>	397
--	-----

15 Ge Nanodroplets Self-Assembly on Focused Ion Beam Patterned Substrates <i>I. Berbezier, A. Karmous, A. Ronda</i>	429
---	-----

16 Metallization and Oxidation Templating of Surfaces for Directed Island Assembly <i>O.D. Dubon, J.T. Robinson, K.M. Itoh</i>	441
--	-----

II.5.2 InGaAs/GaAs Quantum Dots

17 Site Control and Selective-Area Growth Techniques of InAs Quantum Dots with High Density and High Uniformity

K. Asakawa, S. Kohmoto, S. Ohkouchi, Y. Nakamura 463

18 In(Ga)As Quantum Dot Crystals on Patterned GaAs(001) Substrates

S. Kiravittaya, H. Heidemeyer, O.G. Schmidt..... 489

II.6 Growth on Surface Modulations of High Amplitude

II.6.1 SiGe Islands

19 Directed Arrangement of Ge Quantum Dots on Si Mesas by Selective Epitaxial Growth

K.L. Wang, H.-j. Kim 517

20 Directed Self-Assembly of Quantum Dots by Local-Chemical-Potential Control via Strain Engineering on Patterned Substrates

H. Wang, F. Liu, M. Lagally 525

21 Structural and Luminescence Properties of Ordered Ge Islands on Patterned Substrates

L. Vescan, T. Stoica, E. Sutter 543

22 Formation of Si and Ge Nanostructures at Given Positions by Using Surface Microscopy and Ultrathin SiO₂ Film Technology

M. Ichikawa, A. Shklyaeu 569

II.6.2 III-V Quantum Dots

23 Pyramidal Quantum Dots Grown by Organometallic Chemical Vapor Deposition on Patterned Substrates

E. Kapon 591

24 Large-Scale Integration of Quantum Dot Devices on MBE-Based Quantum Wire Networks

H. Hasegawa, T. Sato, S. Kasai..... 639

25 GaAs and InGaAs Position-Controlled Quantum Dots Fabricated by Selective-Area Metalloorganic Vapor Phase Epitaxy	
<i>T. Fukui, J. Motohisa</i>	665
26 Spatial InAs Quantum Dot Positioning in GaAs Microdisk and Posts	
<i>G.S. Solomon, Z. Xie</i>	691