

# Contents

<b>1. Introduction</b>	<b>1</b>
<b>2. Basics of MBE Growth</b>	<b>3</b>
2.1 MBE Apparatus	3
2.2 Understanding of MBE Growth Processes	5
2.3 Solid–Vapor Equilibrium for Binary Compounds	8
2.4 Liquid–Solid–Vapor Equilibrium for Binary Compounds	15
2.5 Particular III–V Materials	16
2.5.1 AlAs	16
2.5.2 InAs	17
2.5.3 InP	18
2.5.4 GaP	19
2.6 Solid–Vapor Equilibrium for Ternary Compounds	20
2.7 Liquid–Solid–Vapor Equilibrium for Ternary Compounds: Surface Segregation of More Volatile Elements	22
<b>3. Doping and Impurity Segregation Effects in MBE</b>	<b>33</b>
3.1 Point-Defect Equilibria in MBE	33
3.2 Impurity Incorporation in MBE	36
3.2.1 General Consideration	36
3.2.2 Manganese Doping of GaAs	37
3.2.3 GaAs Doping with Zn, Cd, Pb, Mg	39
3.2.4 GaAs Doping with S, Se, Te	40
3.2.5 GaAs Doping with Amphoteric Impurities: Ge, Si, Sn	41
3.3 Impurity Segregation in MBE	43
3.4 Interplay Between Impurity Segregation and Diffusion in MBE	47
<b>4. Influence of Strain in the Epitaxial Film on Surface-Phase Equilibria</b>	<b>59</b>
4.1 MBE Growth of Lattice-Mismatched Binary Compound	59
4.2 Growth of Lattice-Matched Solid Solution Formed From Lattice-Mismatched Binaries	66

VIII Contents

<b>5. II–VI Materials</b> .....	71
<b>6. Conclusion</b> .....	75
<b>Index</b> .....	83

Growth Processes and Surface Phase Equilibria in  
Molecular Beam Epitaxy

Ledentsov, N.N.

1999, VIII, 86 p., Hardcover

ISBN: 978-3-540-65794-1