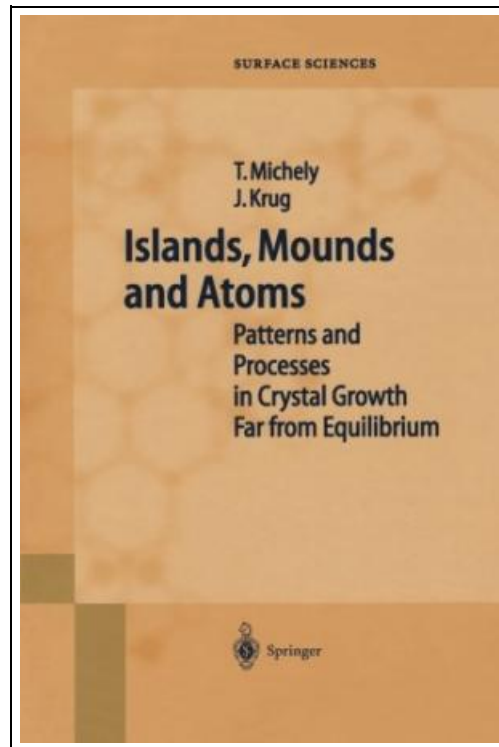


Islands, Mounds and Atoms



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Reviews

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ISLANDS, MOUNDS AND ATOMS



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Book Condition: New. Publisher/Verlag: Springer, Berlin | Crystal growth far from thermodynamic equilibrium is nothing but homoepitaxy - thin film growth on a crystalline substrate of the same material. Because of the absence of misfit effects, homoepitaxy is an ideal playground to study growth kinetics in its pure form. Despite its conceptual simplicity, homoepitaxy gives rise to a wide range of patterns. This book explains the formation of such patterns in terms of elementary atomic processes, using the well-studied Pt/Pt(111) system as a reference point and a large number of Scanning Tunneling Microscopy images for visualization. Topics include surface diffusion, nucleation theory, island shapes, mound formation and coarsening, and layer-by-layer growth. A separate chapter is dedicated to describing the main experimental and theoretical methods. | 1. Introduction.- 1.1 Atoms, Crystals and Visualization.- 1.2 Crystal Growth Far from Equilibrium.- 1.3 Epitaxy.- 1.4 About this Book.- 2. Condensation, Diffusion and Nucleation.- 2.1 Arriving at the Surface: Sticking and Transient Mobility.- 2.2 Moving on: Surface Diffusion.- 2.2.1 The Surface Diffusion Coefficient.- 2.2.2 Transition State Theory.- 2.2.3 Direct Observation of Adatom Diffusion.- 2.2.4 The Onset Method.- 2.2.5 Theoretical Estimates of Diffusion Parameters on Pt(111).- 2.3 Getting Together: Two-Dimensional Nucleation.- 2.3.1 Atomistic Nucleation Theory.- 2.3.2 The Island Size Distribution.- 2.3.3 Experimental Test of Nucleation Theory.- 2.3.4 Binding Energies from Island Densities.- 2.4 Supplementary Topics.- 2.4.1 Condensation on Clusters and at Steps.- 2.4.2 Exchange Diffusion.- 2.4.3 Nucleation and Random Walks.- 2.4.4 Nucleation with Mobile Clusters.- 2.4.5 Adatom-Adatom Interactions and Nucleation Theory.- 2.4.6 Adsorbate Influenced Diffusion and Nucleation.- 3. Island Shapes.- 3.1 Island Shapes and the Hierarchy of Diffusion Processes.- 3.2 The Equilibrium Shape of Adatom and Vacancy Islands.- 3.2.1 Definition and the Wulff Construction.- 3.2.2 Experimental Realization of 2D Equilibrium Shapes.- 3.2.3 The Ising Model and the Awning Approximation.- 3.2.4 Absolute Energy Values for Steps and...



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