NANO 703/703L
Exam 2 - Study Guide

Chap. 13: Diffracted Beams

-Delta function, Fourier transform, convolution theorem

-Crystal potential, unit-cell potential, crystal function

-Incident beam and diffracted beams as plane waves, diffracted-beam amplitudes

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Chap. 14: Bloch Waves

-Solutions of the wave equation for high-energy electrons in the periodic crystal potential.

-Periodic structure function $U(\mathbf{r})$, extinction distance $\xi_{\mathbf{g}}$

-Two-beam condition, strong two-beam condition, general two-beam result $\Psi_{\mathbf{g}}(z)$

Chap. 16: Diffraction from Crystals

-Structure factor definition; Forms for *sc*, *bcc*, *fcc* lattices

-Diamond and zincblende structures

-Systematically absent and kinematically forbidden reflections

-Superlattices, atomic ordering

Chap. 17: Diffraction from Small Volumes

-Effective excitation error

-Kinematical approximation

-Diffraction from thin crystals, relrods

Chap. 18: Indexing Diffraction Patterns

-Determining zone axisP

-Indexing spot patterns; indexing ring patterns

Chap. 19: Kikuchi Diffraction

-Variations with beam/sample tilt of diffraction-spot position, intensity

-Origin of Kikuchi diffraction: diffuse scattering; Kossel cones

-Kikuchi bands, maps

-Dependence of Kikuchi-line positions on beam/sample tilt; measuring excitation error

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Chap. 20: Convergent-Beam Diffraction

-Differences between selected-area and convergent-beam diffraction

-Influences of condenser aperture size, first condenser lens current

-Kossel-Mollenstedt vs. Kossel patterns

-Kikuchi and HOLZ (Bragg) lines in CBED

-Indexing spots in HOLZ ZAP diagrams

-Determing type of ZAP

Chap. 21: Using CBED

-Influence of thickness, extinction distance and thickness determination

-HOLZ ring radius

Chap. 22: Ampitude Contrast

-Contrast definition

-Mass-thickness contrast

Lab 6: Atomic Force Microscopy

Lab 7: Raman Spectroscopy

Lab 8: TEM Sample Prep: Ultramicrotomy

Lab 9: TEM Sample Prep: Polishing, Dimpling, Ion Milling

Lab 10: TEM CBED