

RUTGERS, THE STATE UNIVERSITY OF NEW JERSEY
School of Arts and Sciences
Department of Chemistry and Chemical Biology
16:160:577 Solid State Chemistry, Spring 2012

Lecture: Two 80 min. classes/week **3:20 - 4:40 pm, Tues & Thur**
Instructors: **M. Greenblatt & D. O'Carroll** **WR 260, BUSCH**
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Textbooks:

(1) L.E. Smart and Moore, "Solid State Chemistry: An Introduction," 3rd edition, ISBN 0-7487-7516-1 (recommended); (2) S.E. Dann, "Reactions and Characterization of Solids," ISBN 0-471-22481-2 (recommended); Supplemental Textbooks: Richard Tilley, Understanding Solids: The Science of Materials; A.R. West, "Basic Solid State Chemistry."

Course Topics

Jan 17th: Crystal Structure, Crystal Systems,
Jan 19th: Translational Symmetry, Bravais Lattices, Point Symmetry
Jan 24th: [Electronic Band Structure, Density of States](#)
Jan 26th: [Band Structure in Different Types of Solids](#)
Jan 31st: Common Structure Types: Metallic, Ionic, Covalent Solids
Feb 2nd: Molecular Solids, Framework Nets and Structure Topology
Feb 7th: Ionic Bonding & Pauling's Rules
Feb 9th: The Bond Valence Concept
Feb 14th: Atomic Orbitals & Periodic Trends
Feb 16th: Basic Concepts of Molecular Orbital Theory
Feb 21st: Bonding, Structure & Properties in Covalent Solids
Feb 23rd: Basic Concepts of Diffraction
Feb 28th: Generation of X-Rays, X-Ray Diffraction
Mar 1st: Powder X-Ray Technique
Mar 6th: Review class
Mar 8th: Mid-Term
Mar 20th: [Colors in Solids: Pigments & Gemstones](#)
Mar 22nd: [Luminescent Materials: Display Technology](#)
Mar 27th: [Conductive and Carrier Transport](#)
Mar 29th: [Semiconductors and Their Applications](#)
Apr 3rd: [Organic v's Inorganic Semiconductor Properties](#)
Apr 5th: [Magnetism and Magnetic Materials](#)
Apr 10th: [Carrier Transport in Transition Metal Oxides](#)
Apr 12th: [Dielectric Properties and Dielectric Materials](#)
Apr 17th: [Metal and Metal-Oxide Nanostructures](#)
Apr 19th: [Ionic Conductivity: Batteries and Fuel Cells](#)
Apr 24th: [Present-day solid state device technologies](#)
Apr 26th: [Review Class](#)