

SYLLABUS

Synthesis and Reaction of Macromolecules

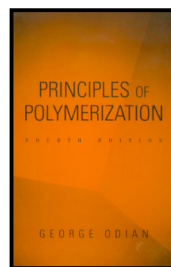
Chemistry 5704, FALL 2006

Tuesdays/Thursdays 12:30 to 1:45, **Chem-Physics 402**

Instructors: H.W. Gibson (hwgibson@vt.edu), J.E. McGrath (jmcgrath@vt.edu)
J.S. Riffle (judyriffle@aol.com)

Chemistry 5704 is the first of a two-semester graduate sequence devoted to the synthesis and reactions of macromolecules. The first-semester will cover the principles of Free Radical Chain Growth and Step-Growth Polymerization along with advanced current topics in these areas. Knowledge of organic chemistry and some background in polymer chemistry will be assumed.

Text: G. Odian, Principles of Polymerization,
4th Edition, Wiley and Sons, 2004.
ISBN: 0-471-27400-3



SYLLABUS

Date	Professor	Lecture Topic/Experiment
Aug. 22, 24	McGrath	Introduction to Macromolecules
Aug. 29	Gibson	Macromolecular Nomenclature I
Aug. 31	Gibson	Macromolecular Nomenclature II
Sept. 5	McGrath	Fundamentals of Step-Growth Polymerization Polyesters, polyamides, reaction kinetics
Sept. 7	McGrath	Poly(arylene ethers), Poly(aryl carbonates)
SEPT. 12	Exam #1 (Evening)	
Sept. 19	McGrath	Molecular Weight and Endgroup Control
Sept. 21	McGrath	Polyurethanes/Segmented Copolymers
Sept. 26	McGrath	Polyurethanes/Ureas
Sept. 28	McGrath	Sulfonated Copolymers
Oct. 3	Gibson	Chain Growth Polymerization Free Radical Polymerization I
Oct. 5	Gibson	Free Radial Polymerization II
Oct. 10	Riffle	Networks (Thermosets)

Oct. 12	Riffle	Networks via Step Reactions
Oct. 17	Gibson	Free Radical Polymerization III
Oct. 19	Gibson	Free Radical Copolymerization I
Oct. 24	Gibson	Free Radical Copolymerization II
Oct. 26	Gibson	Free Radical Copolymerization III
Oct. 31	Gibson	Emulsion Polymerization
Nov. 2	Exam #2 (Evening)	
Nov. 7	Gibson	Low Molar Mass Liquid Crystals
Nov. 9	McGrath	High Temperature Polymers (PI, PBI, PBO, etc.)
Nov. 14	McGrath	Liquid Crystal Polymers
Nov. 16	Gibson	Ring Opening Free Radical Polymerization
Nov. 20-24	THANKSGIVING WEEK	
Nov. 28	Gibson	Conformational Analysis, Tacticity
Nov. 30	Gibson	Conformational Analysis, Tacticity, con't
Dec. 5	McGrath	High Temperature Polymers, cont.
Dec. 7	READING DAY	
TBA	REVIEW	
Dec.	FINAL EXAM	

Grading will include *two midterm tests along with a final exam*. In addition, the course requirements will include written two-page summaries of recent journal references provided by the instructors after each lecture. The writing style and content will both be part of the resulting grades. We anticipate the two midterm tests will add up to a total of 50%, the final exam (comprehensive) will be an additional 25%, and the homework, including the two-page write-ups will correspond to 25%.