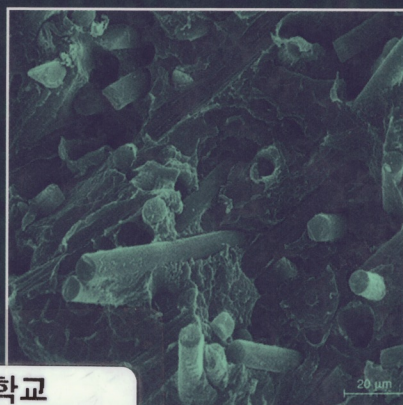


WILEY

Introduction to

PHYSICAL POLYMER SCIENCE



전남대학교



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STUDY PROBLEMS

1. What are the chemical structures of isotactic, syndiotactic, and atactic polystyrene?
2. (a) What are the chemical structures of *cis*- and *trans*-polybutadiene, and (b) the 1,2- and 3,4-structures of polyisoprene?
3. How do head-to-head and head-to-tail structures of poly(methyl methacrylate) differ?

4. Show the structures of statistical and alternating copolymers of vinyl chloride and ethyl acrylate.
5. *Cis*-polyisoprene has been totally hydrogenated. What is the name of the new polymer formed?
6. What are the two possible triblock copolymer structures of polybutadiene and cellulose?
7. Using Table 2.6, calculate the run numbers and average sequence lengths for the two poly(ethylene-*stat*-1-hexene) copolymers. Do they indeed appear to be statistical copolymers?
8. A graft copolymer is formed with polybutadiene as the backbone and polystyrene as the side chains. What is the name of this material?
9. Compare and contrast infrared and Raman spectra with NMR techniques for their capability of characterizing (a) tacticity and (b) *cis* and *trans* double bonds in polymers.
10. Chemical nomenclature forms the alphabet of polymer science. (a) What is the chemical structure of *it*-poly(vinyl chloride)-*block*-*cis*-1,4-polyisoprene? (b) Poly(vinyl acetate) is totally hydrolyzed. What new polymer is formed? What polymer is formed if the hydrolysis is only partial?
11. In the accompanying structures, P_1 is poly(vinyl acetate), P_2 is poly(ethyl acrylate), and P_3 is polystyrene. What are the chemical names of these structures?

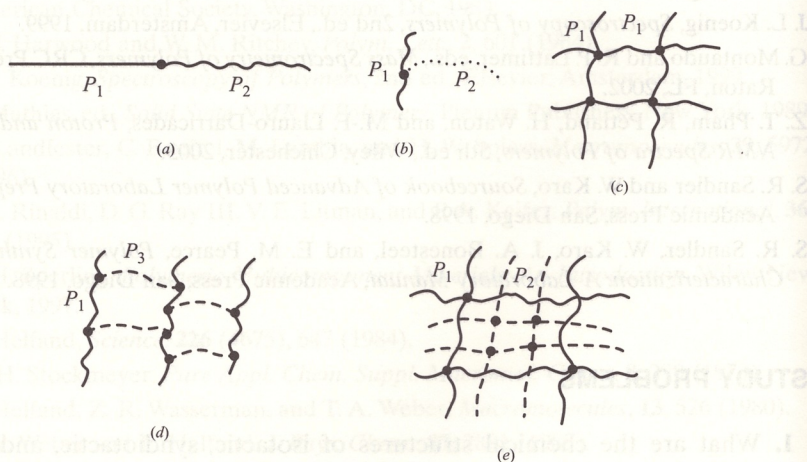


Figure P2.11 Various polymer structures.

12. Your new assistant copolymerized styrene and *n*-butyl acrylate, 50/50 mole-%.
 "I made it in such a way as to produce an alternating copolymer," he said.
 "No," you replied, "I think you really made a statistical copolymer."

At that instant, you boss walk a block copolymer," she volunt
 (a) Using the concepts of pho
 gnish the three possibilities. F
 function of composition? (Prep
 powerful tool. Use a hydrogen I
 tinguish the three possibilities.
 tables of resulting data.

13. There was an old Prof.
 Who lived in a lab
 He had so many students
 He became an old crab.

He gave some an IR
 And some an NMR
 "Show me a stretch
 With an old fashioned *kvetch*,
 And earn an *A* who you are!"

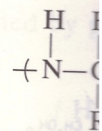
Saying so, he handed the studen
 stretched (while hot) $\times 2$, $\times 4$, and
 now at room temperature, crysta
 think took place?" He asked. Plo
 strain.

APPENDIX 2.1 ASSORTED ISOM MACROMOLECULES

In addition to the types of isomeric ar
 text of the chapter, there are several o
 be aware.

Proteins

Proteins have the general structure



and hence are sometimes called nylon
 acids (A1), each with a specific type of
 follow very specific sequences, which f
 of plant or animal. (Note the various k
 in the broad sense of the term, they a