



# Polymer Science and Technology (3rd Edition)

*Joel R. Fried*

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# Polymer Science and Technology (3rd Edition)

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## **Polymer Science and Technology (3rd Edition) Joel R. Fried** **The Definitive Guide to Polymer Principles, Properties, Synthesis, Applications, and Simulations**

Now fully revised, *Polymer Science and Technology, Third Edition*, systematically reviews the field's current state and emerging advances. Leading polymer specialist Joel R. Fried offers modern coverage of both processing principles and applications in multiple industries, including medicine, biotechnology, chemicals, and electronics.

This edition's new and expanded coverage ranges from advanced synthesis to the latest drug delivery applications. New topics include controlled radical polymerization, click chemistry, green chemistry, block copolymers, nanofillers, electrospinning, and more.

A brand-new chapter offers extensive guidance for predicting polymer properties, including additional coverage of group correlations, and new discussions of the use of topological indices and neural networks. This is also the first introductory polymer text to fully explain computational polymer science, including molecular dynamics and Monte Carlo methods. Simulation concepts are supported with many application examples, ranging from prediction of PVT values to permeability and free volume.

Fried thoroughly covers synthetic polymer chemistry; polymer properties in solution and in melt, rubber, and solid states; and all important categories of plastics. This revised edition also adds many new calculations, end-of-chapter problems, and references.

In-depth coverage includes

- Polymer synthesis: step- and chain-growth; bulk, solution, suspension, emulsion, solid-state, and plasma; ionic liquids, and macromers; and genetic engineering
- Amorphous and crystalline states, transitions, mechanical properties, and solid-state characterization
- Polymers and the environment: degradation, stability, and more
- Additives, blends, block copolymers, and composites—including interpenetrating networks, nanocomposites, buckyballs, carbon nanotubes, graphene, and POSS
- Biopolymers, natural polymers, fibers, thermoplastics, elastomers, and thermosets
- Engineering and specialty polymers, from polycarbonates to ionic polymers and high-performance fibers
- Polymer rheology, processing, and modeling
- Correlations and simulations: group contribution, topological indices, artificial neural networks, molecular dynamics, and Monte Carlo simulations

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