## CONTENTS

## Page I. GENERAL Interaction of Radiation and Matter ..... 1 Units of Measurement 2 4 Gamma Rays ..... 4 Electrons ..... 4 Neutrons ..... 5 5 Protons, Deuterons, a-particles, Fission Fragments 5 General Laws of Radiation Chemistry of High Polymers ..... 5 **II. RADIOCHEMICAL PROCESSES IN POLYMERS** Changes in Properties of Polymers as a Result of Irradiation Physico-Chemical Changes Taking Place in Polymers During 9 10 Cross-Linking, Mechanism of the Process ..... 14 Degradation ..... 16 Changes in Solubility and in Molecular Weight..... Gas Liberation ...... 18 21 Oxidation ..... Changes in the Concentration of Double Bonds..... 24 Change in Physical Properties ..... 27 28 Degree of Crystallinity ..... 29 Specific Gravity 30 Coefficient of Thermal Expansion ..... 30 Electrical Properties ..... 33 Change in Mechanical Properties ..... 33 Thermo-Mechanical Properties of Irradiated Polymers 34 Modulus of Elasticity ..... 36 Strength and Specific Elongation ..... 37 Permeability to Gases .....

v

		Page
III.	INFLUENCE OF RADIATION ON VARIOUS HIGH POLYMERIC MATERIALS	I ugo
	Polymers Which are Cross-Linked by Irradiation-Polyethylene	37
	Polystyrene	41
	Natural and Synthetic Carbon Chain Rubbers	42
	Polysiloxanes	49
	Polyvinyl Chloride, Polychloroprene, Fluorine-Containing Rubbers	52
	Polymers Degraded by Irradiation ~ Polymethyl Methacrylate	56
	Polyisobutylene	58
	Polytetrafluoroethylene, Polytrifluorochloroethylene	60
	Fibers	62
	Conclusion	67
	Appendix	68