Brédas / Silbey

Conjugated Polymers

The Novel Science and Technology of Highly Conducting and Nonlinear Optically Active Materials

CONJUGATED POLYMERS: THE IMTERPLAY BETWEEN SYNTHESIS, 1 STRUCTURE, AND PROPERTIES C. B. GORMAN and R. H. GRUBBS 1. Introduction 2 2. Structural Features of Conjuqated. Polyaers 3 3. Polymer Synthesis: Basic Methods 4 3. 1 Step-Growth Polymerization 5 3. 2 Chain-Growth Polymerization 6 3. 3 Rinq-Openinq Polymerization 8 4. Direct Synthetic Methods 8 4. 1 Electrochemical Synthesis 9 4. 2 Synthesis by Step-Growth Polymerization 11 4. 2. 1 Polyaniline (PAN) 11 4. 2. 2 Poly(Phenylene Sulfide) 12 4. 2. 3 Poly thiophene and its Derivatives 13 4. 2. 4 Other 5-membered Heterocyclic 16 Derivatives 4. 2. 5 Polyparaphenylene (PPP) 17 4. 2. 6 Polysilanes 18 4. 2. 7 Polymers of Phthalocyanines 19 4. 2. 8 Other Conjugated Metal Coordination 20 Polymers 4. 2. 9 Ladder Polymers 21 4. 3 The Unusual Topochemical Polymerization to 23 form Polydiacetylenes 4. 4 Chain-Growth Polymerizations 24 4. 4. 1 Polyacetylene via Ziegler-Natta 24 Polymerization 4. 4. 2 Ring-Opening Metathesis Polymerization 26 Routes to Polyacetylenes 5. Polymers fro. precursors 27 5. 1 Polyparaphenylene (PPP) 27 5. 2 Poly(Phenylene Vinylene) (PPV) and Other 28 Vinylene Polymers 5. 3 Precursors to Polyacetylene 29 6. Extentions of these Methods in the Synthesis of 31 ·saall-Bandqap· Pplymers 7. Conjuqated. Polymer Matrices 33 8. Conclusions and Caveats 35 Acknowled. qements 36 References 36 vi TABLE OF CONTENTS PROPERTIES OF HIGHLY CONDUCTIHG POLYACETYLEHE 49 Th. SCHIMMEL, D. GLASER, M. SCHWOERER AND H. NAARMANN 1. Introduction 50 2. SBllpie Synthesis, Ilorphology and Properties 52 2.

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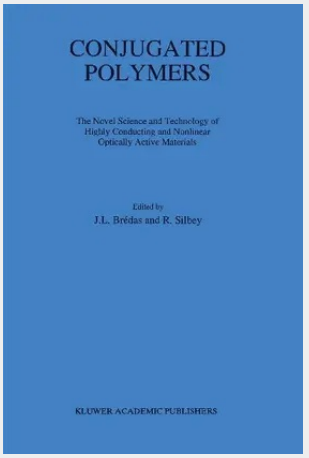

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