Meetings International

Polym Sci 2017, 3:4
DOI: 10.4172/2471-9935-C1-006

Synthesis, characterization and functions of biomass eugenol based helical polymers

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Eugenol (4-allyl-2-methoxyphenol) is a main component (80 wt. %) of clove oil, which is mainly produced in Indonesia. It is widely used as perfumes, antioxidants, drugs, foods and taste items. Eugenol is inexpensive natural resource, which carries reactive phenolic hydroxyl and allyl group and is therefore expected as a key component for environmentally friendly organic synthetic chemistry. On the other hand, biopolymers, exemplified by proteins and DNA, adopt three-dimensionally well-ordered structures, which indispensable for the maintenance of living systems. Although the formation of such regular secondary structures is obviously entropically unfavorable, protein and DNA construct well-arranged helical structures, which are stabilized by hydrogen bonding. The energy of hydrogen bonding compensates the entropic cost. This is the strategy of nature to provide three-dimensionally well-ordered biopolymers. The incorporation of naturally derived eugenol in addition to amino acids into polyacetylene is interesting from the view point of green, sustainable chemistry and polymerization chemistry. This paper is report the synthesis of polymers from eugenol as starting material and examination of polymerization with (nbd) Rh+[η^6-C_6H_5B-$(C_6H_5)_3$] catalyst, which is effective to polymerization mono substitutes acetylene. Characterization of polymers can be soluble in common organic solvent and can be form thermo responsive material so can be function as smart or intelligent material.

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