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The synthesis and characterization of farnesene-based polyols

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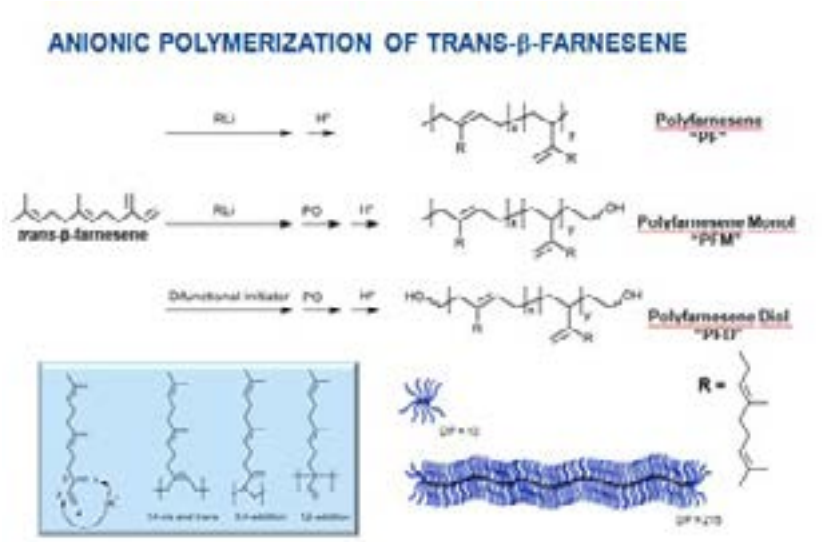
A bio-based route to the production of *trans*-β-farnesene has recently been commercialized. *Trans*-β-farnesene is capable of being polymerized by both anionic and cationic pathways, creating low molecular weight polymers with structure-property relationships unique within the diene class of monomers.

Trans-β-farnesene is produced through fermentation of sugar feedstocks. The pathway offers an alternative to petroleum-based feedstocks derived from cracking processes. Anionic polymerization of the monomer produces a highly branched "bottle-brush" structure, with rheological and thermal properties that are markedly different than those of traditional linear diene polymers. Specifically, a lack of entanglements is observed even at relatively high molar masses.

The synthesis and characterization of *trans-β*-farnesene-based polymers will be presented, including anionically prepared low molecular weight diols and monols. Their utility as novel polyols in various end-use applications such as prepolymers for polyurethane synthesis will be reviewed.



Biography

Steven K. Henning is Total Cray Valley's Global Director for Research and Development. Henning previously managed the Rubber Applications Lab for the Sartomer Company. His career began at The Goodyear Tire and Rubber Company in Akron, OH working for the Exploratory Polymer Research group as part of Corporate Research, North American Tire Division, and later for Goodyear's Chemical Division as Team Leader for Anionic and Emulsion Polymer Development. Henning received his BS degree in Materials Science and Engineering from The Pennsylvania State University and was conferred a master's degree in Polymer Science from the University of Akron. He is inventor on over 20 US and international patent files and has published extensively in the area of polymer science.

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