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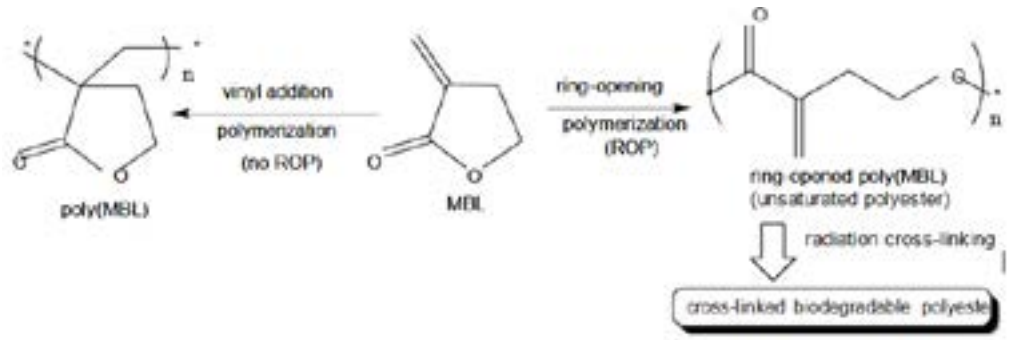
Poly(α-methylene-γ-butyrolactone) as potential smart polymeric material for healthcare applications

Pascal Binda and **Rasaan Ford**
Savannah State University, USA

Aliphatic polyesters are commonly applied in bio-medical engineering for drug delivery devices and tissue engineering products because of their biodegradable and biocompatible properties. Unsaturated aliphatic polyesters, such as poly(α-methylene-γ-butyrolactone) (PMBL), are of scientific and technological interest for producing tailor-made functionalized biodegradable shape memory materials due to their exocyclic alkene functionality. Cross-linking in biodegradable polymers, like hydrogels, usually produces shape memory polymers that are sensitive to their environment. Due to unfavourable thermodynamics involved in the ring-opening polymerization (ROP) of MBL, which is from its low strain energy of the five-membered lactone ring that brings about too small negative change of enthalpy (ΔH) to offset a large negative entropy change (ΔS) of its ROP, MBL prefers vinyl addition polymerization to ROP. Therefore, ring-opening homo polymerization of MBL and developing an effective cross-linking strategy will provide a gateway into a smart biodegradable polymeric material for shape-memory applications.



Biography

Binda is an Associate Professor of Chemistry at Savannah State University, USA. He obtained his Ph.D. in 2008 from the University of North Dakota in Grand Forks, ND USA and earned a bachelor's degree in Chemistry (First Class Honors) from the University of Buea in Cameroon. Binda is a member of American Chemical Society Division of Polymer Chemistry.

bindap@savannahstate.edu

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