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Synthesis of biobased nano composite materials: Metal nano particles stabilized in soy bean oil polymer

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Polyunsaturated plant oils have gained great interest as monomers to produce biodegradable polymers obtained from renewable resources due to the limited existing sources of petroleum oil and environmental issues. Among them, soybean oil is a triglyceride of saturated and poly unsaturated fatty acids which can be polymerized via autoxidation by exposure to atmospheric oxygen at room temperature. Precious metals can catalyze the autoxidation process of unsaturated oils increasing the molecular weight with peroxide linkages in order to obtain soy oil polymer. The polymeric oil was fractionated by the extraction from the solvent-non-solvent mixture $CHCl_3$/petroleum ether with the volume ratio of 5:15. Three polymeric oils fractions with different molecular weight (ca. 1000, 4000, and 40,000 g/mol) were obtained. Surface plasmon resonance and fluorescence emission of the nanocomposite solutions were observed. Transmission electron microscopy was used to determine size and shape of the metal nano particles. This macro peroxide initiator containing metal nanoparticles was used in free radical polymerization of some vinyl monomers in order to obtain olefin polymers containing metal nano particles. The detailed characterization of the composite materials was performed by NMR, FTIR, GPC, DSC and other physicochemical characterization methods.

Biography

Baki Hazer received his PhD degree from the Department of Chemistry, College of Arts and Sciences, Karadeniz Technical University in 1978, and his MS and BS degrees in Chemical Engineering from the College of Chemical Engineering, University of Istanbul in 1972. He had an honorary membership by the Turkish Chemical Society in May 2005. He received Fulbright Fellowship and the NATO Collaborative Research Grant at the Department of Polymer Science and Engineering, University of Massachusetts, Amherst. He was a Visiting Scientist for the NSF joint research project at The University of Akron. He is specialized in polymers from renewable sources, block and graft copolymers, macromonomeric initiators. He has published more than 140 papers in reputed journals.

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