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Modification of polymer properties by use of modified oligomers and chain structures

Traditional methods for the modification of polymeric properties typically involve the use of various small molecule additives to add functionality within the polymer matrix. While these methods have proven successful, they usually come with numerous tradeoffs that cause the polymer to be a compromise that includes the property that is desired along with a reduction of some other properties. A typical example of this is modification of materials for impact strength or toughness. While the typical methods (i.e. addition of a modified rubber polymer, "core-shell" polymer, or plasticizer) can all affect these desired properties, they tend to compromise the high mechanical properties such as glass transition temperature, modulus and other properties like formability or the ability to chemically bond structures. In this overview paper, we will examine two examples of this type of modification, using structures that change the structure of the polymer itself, without compromising other desirable properties. The examples involved are: Modification of toughness of a composite network using a block copolymer that has a controlled Radical Polymerization functionality to it and; using a functionalized macromonomer to enhance flame retardant properties of a traditional thermoplastic without compromising thermoforming or bonding capabilities.

Biography

Michael O Wells has served in various positions with in the polymer industry for 30 years. He has held positions with such organizations as Procter and Gamble, A O Smith, Witco, Arkema and currently holds the position of the Director of Research and Development for Reynolds Polymer Technology. He is a graduate of Arkansas State University with a Bachelor's degree in Chemistry and Lehigh University with a M.Eng. in Polymer Science and Engineering. Over his career, he has spoken at various conferences within the polymer and composites industries. His main areas of research are polymer initiation systems and polymer structure/property modification. He holds two US patents.

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