OP-17-1227

Thursday, May 12, 2011, 03:55-04:15 pm
Room: Karam 3

CHEMICAL MODIFICATION OF PP ARCHITECTURE: STRATEGIES FOR INTRODUCING LONG-CHAIN BRANCHING

[a]Khalil El Mabrouk, [b]J. Scott Parent, [c]Bharat I. Chaudhary, [d]Ronjuan Cong

a INANOTECH, Institute for Nanomaterials and Nanotechnology. MASciR, Moroccan for Advanced Science, Research and Innovation Fundation, Ave. De l'Armée Royale, Madinat El Irfane 10.100, Rabat, Morocco, b Department of Chemical Engineering Queen's University, Kingston, ON, Canada K7L 3N6, c The Dow Chemical Company, 171 River Road, Piscataway, NJ 08854, USA and d The Dow Chemical Company, 2301 Brazosport Blvd, Freeport, TX 77541-3257, USA

Two strategies for introducing long chain branching (LCB) to a polypropylene homopolymer (PP) are evaluated in terms of the product's molecular weight and branching distributions, and in terms of melt state shear and extensional rheological properties. Single step processes involving radical-mediated addition of PP to triallyl phosphate are shown to generate bimodal products with highly differentiated chain populations, while a two step sequence involving PP addition to vinyltriethoxysilane followed by moisture-curing is shown to generate more uniform architectures. As a result, the sequential approach can improve low-frequency shear viscosity and extensional strain hardening characteristics while staying below the polyolefin's gel point. The composition and molecular weight distribution transformations that underlie sequential LCB techniques are discussed.