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Synthesis and melt behavior of comb-like co-polymers with high branching degree

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Using a co-polymer of styrene (St) with 4-(vinylphenyl)-1-butene (VSt) (PSVS) as the backbone, a series of model comb-like polymers were synthesized by means of “graft onto” strategy in this work. The branching density of these comb-like co-polymers is higher than that of traditional graft co-polymer with low branching density, but lower than that of poly(macromolecular monomer). The influences of branching parameters (branching chain length and branching density) and branching chain composition on the rheological properties of comb-like polymers were studied. When the branching chain was polystyrene (PS) chain, which is miscible with the backbone in the PSVS-g-PS, the linear rheological studies showed that PSVS-g-PS presented hierarchical relaxation process, that is, the relaxation of the side chain (intermediate angular frequency region) and the whole comb polymer (the terminal region). When the branching chain was polyethylene (PE) chain, which is immiscible with the backbone in the PSVS-g-PE, in this case, the microstructure and linear rheological properties of the melt strongly depended on the branching density and the length of the side chains in PSVS-g-PE. We further discussed possible reason about the strong effect of branching parameters and branching chain composition on the rheological properties of comb-like polymers.

Biography

Tao Tang has completed his PhD in 1991 from Changchun Institute of Applied Chemistry (CIAC), Chinese Academy of Sciences. He is a Full Professor of Polymer Chemistry in CIAC. He has published more than 230 papers in reputed journals.

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