Homogeneous Polyhedral Oligomeric Silsesquioxane (POSS)-Supported Pd–Diimine Complex and Synthesis of Polyethylenes End-Tethered with a POSS Nanoparticle via Ethylene “Living” Polymerization


Preparation of Polyethylenes End-Tethered with POSS

Preparation of complex

Ethylene polymerization

Significance: Preparation of a homogeneous polyhedral silsesquioxane (POSS)-supported Pd–diimine complex 3 and telechelic polyethylenes end-tethered with POSS nanoparticles 5 was reported. Thus, complex 3 was prepared by the reaction of a Pd–diimine catalyst 1 with acryloisobutyryl-POSS 2 at room temperature for 48 h (40% yield). Ethylene polymerization was carried out with 3 at 5 °C under 27.5 bar in chlorobenzene followed by quenching 4 with triethylsilane to afford compound 5.

Comment: Monitoring results of 5 led to the following conclusions: The number average molecular weight (Mn) was increased in proportion to time (1 h; 15.2 kg/mol vs 6 h; 56.4 kg/mol). The polydispersity index (PDI) value was within 1.11–1.19. $^1$H NMR measurements exhibited that these polymers were branched with ca. 88 branches per 1000 carbons.