Nickel(II) Carbosilane Dendrimers: Structure and Polymerization Catalysis

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Nickel(II) compounds containing sterically demanding a-diimine ligands, and related chelates, have been found to be attractive catalysts for the production of polyolefins.^[1] Dendrimers can be used as welldefined supports for active centers in homogeneous phase, which catalytic applications are being widely studied,^[2] including those in polymerization processes.^[3] In this work, a series of carbosilane dendritic compounds Gn-ONNMe_mNiBr₂ (n = 0, 1, 2, 3; m = 0, 2, 3), from monometallic to metallodendritic structures containing up to sixteen (n = 3) terminal pyridylimine nickel complexes, have been synthesized, and the crystal structure of some model compounds have been determined. The nickel complexes, in combination with methylaluminoxane (MAO), convert ethylene into mixtures of toluene-insoluble polyethylene and oily oligomers. The variation of the pyridylimine ligand framework by m methyl subtituents has a decisive influence on the activities of the nickel compounds. Also, the generation of the dendritic precursor (n) acutely affects the catalyst performance and the microstructure of the insertion products as well. Thus, higher generation catalysts show superior oligomerization activities and produce less branched polyethylene.

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Keywords: nickel, dendrimers, polymerization