

Synthesis of branched polyethylene from ethylene by tandem action of iron and zirconium single site catalysts

Quijada, Raúl

Rojas, René

Bazan, Guillermo

Komon, Zachary J.A.

Mauler, Raquel S.

Galland, Griselda B.

The synthesis of low-density polyethylene from ethylene as the only monomer feed has been investigated as an alternative route to branched polyethylene and to obtain new materials with different properties, avoiding the need to feed 1-alkenes into the polymerization process. The details of the evaluation of two combination catalyst systems based on single site catalysts are discussed. The $\{[(2\text{-ArN}=\text{C}(\text{Me}))_2\text{C}_5\text{H}_3\text{N}]\text{FeCl}_2\}$ (Ar = 2-C₆H₄(Et)) compound, designated as catalyst 1, oligomerizes ethylene to produce linear α -olefins with high selectivity, and Me₂SiInd₂ZrCl₂ (2) or EtInd₂ZrCl₂ (3) are used as catalysts that incorporate the α -olefins in the polymer. For catalyst 1 in the presence of methylaluminoxane (MAO) and ethylene, a wide range of α -olefin products were found, both soluble and insoluble. Also, tandem catalyst combinations 1 and 2 or 1 and 3 in the presence of ethylene alone can readily produce branched polyethylene with levels of 1-4 branches per 100 units of ethylene. A change i