

SYNTHESIS OF POLYMERS WITH POLAR GROUPS AND IN THE PRESENCE OF WATER USING SINGLE-SITE CATALYSTS

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Polymerizations with single-site catalysts are of great importance because of high polymerization activities, excellent control of polymer synthesis and the resulting polymer properties. A drawback of typical metallocene catalysts, which are currently applied industrially for the synthesis of the major commodity polyolefins, is that they are unstable in the presence of polar compounds. Therefore, there is a great interest in finding single-site catalysts that would be able to polymerize polar monomers to such polymers as poly vinyl chloride or poly methyl methacrylate. Furthermore, these new types of single-site catalysts would enable polymerization in water as a solvent, which would be environmentally friendly in comparison to the currently used organic solvents. We will present results we have obtained so far on the polymerization activities and comonomer incorporation of ethylene with methyl acrylate using 2,6-diacetylpyridine (2,4,6-trimethylanyl) iron (II) chloride with methylaluminumoxane. Additionally, we will report on two polymerization catalysts based on nickel enolate compounds for emulsion polymerizations conducted in water. No cocatalysts are applied in these cases. In the future we are also planning to complete a series of ethylene/acrylate copolymerizations using a modified metallocene catalyst with tris(pentafluorenyl) borane as cocatalyst. Results of the characterizations of the polymers using Fourier Transform Infrared Spectroscopy (FTIR), Proton Nuclear Magnetic Resonance Spectroscopy (¹H-NMR), Differential Scanning Calorimetry (DSC), and Thermal Gravimetric Analysis (TGA) will be also presented.