

# Copolymerization of Ethylene/Diene with Different Metallocene Catalysts

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Copolymerizations of ethylene and 1,7-octadiene were carried out employing homogeneous catalysts  $\text{Cp}_2\text{ZrCl}_2$ ,  $\text{Ph}_2\text{C}(\text{Flu},\text{Cp})\text{ZrCl}_2$  and  $\text{Et}(\text{Ind})_2\text{ZrCl}_2$ , and methylaluminoxane as cocatalyst. The polymerization characteristics, such as catalytic activity, polymerization rate, copolymer composition, and thermal properties were examined in relation to the catalyst type. Different comonomer concentrations were employed, and the reaction time was varied, ranging from 1 h up to 4 h, at 90 °C and at 0.5 bar ethylene pressure. The results showed that the catalyst  $\text{Cp}_2\text{ZrCl}_2$  was more efficient than  $\text{Et}(\text{Ind})_2\text{ZrCl}_2$  in the preparation of high diene content ethylene/1,7-octadiene copolymers. On the other hand,  $\text{Et}(\text{Ind})_2\text{ZrCl}_2$  and  $\text{Ph}_2\text{C}(\text{Flu},\text{Cp})_2\text{ZrCl}_2$  catalysts produced low insaturation content but possibly formed cyclic structures and crosslinking.

*Key words:* Ethylene Copolymer, Non-Conjugated Dienes, Metallocene Catalysts, Polyolefins, Copolymerization