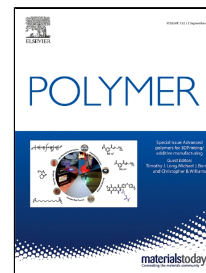


# Accepted Manuscript

Characterization of the chemical composition distribution of polyolefin plastomers /elastomers (ethylene/1-octene copolymers) and comparison to theoretical predictions



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1 **Characterization of the chemical composition distribution of polyolefin**  
2 **plastomers/elastomers (ethylene/1-octene copolymers) and comparison to theoretical**  
3 **predictions**

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11 **Keywords:** polyolefin plastomers/elastomers; high performance liquid chromatography;  
12 Stockmayer distributions

13

14 **Abstract**

15 Ethylene/1-olefin copolymers with a 1-olefin content >10 wt%, known as polyolefin  
16 plastomers (POP) and elastomers (POE), are materials of growing commercial importance. A  
17 relevant example are ethylene/1-octene (EO) copolymers. The thermal properties of nine 1-  
18 octene based POP/POE were studied by differential scanning calorimetry (DSC). The  
19 obtained thermograms were indicative of an asymmetric chemical composition distribution  
20 (CCD), triggering further investigations. At first, analytical temperature rising elution  
21 fractionation (a-TREF) was employed which gave further evidence of an asymmetric CCD for  
22 some samples. Given the low crystallinity of many of the samples, their CCD could, however,  
23 only be studied by high temperature high performance liquid chromatography (HT-HPLC).  
24 The hypothesis about an asymmetric CCD could be confirmed for all samples. The results  
25 were compared with theoretically calculated CCD (Stockmayer distributions) which are  
26 symmetrical. In a semiquantitative comparison, the main peak of the experimental CCD was  
27 found to be in good agreement with Stockmayer distributions.

28 **1. Introduction**

29 Polyolefins continue to be the synthetic polymers produced in largest quantity world-wide,  
30 finding countless applications, ranging from endoprostheses to automotive parts and  
31 packaging foils [1, 2]. The success of polyolefins is in large part due to their immensely

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