

FRACTIONATION OF POLYPROPYLENE IMPACT COPOLYMERS USING TEMPERATURE RISING ELUTION FRACTIONATION (TREF)

Sebenzile Mncwabe¹, Piet Nhlapo¹, Linda Botha¹, Nyambeni Luruli¹, Evangelia Marantos¹

¹ Sasol Polymers, 22 Pressburg Road, Founders View, Modderfontein

ABSTRACT

Polymers in general have complex microstructures compared to small molecules. The investigation of polypropylene ethylene block copolymers (impact copolymer (ICP)) was conducted in order to understand the copolymer composition and the role of particular components by fractionation. Temperature rising elution fractionation (TREF) was used for fractionation of ICP which involves breaking up the polymer into small fractions that can be further analysed to give more understanding on the complex microstructures. Two ICP samples (1 and 2) which failed physical properties tests were fractionated. The bulk samples as well as the resulting fractions were further analysed on the DSC and FTIR. The results show the highest fractions for both Samples 1 and 2 precipitating at 110°C. The DSC melting and crystallization curves of the bulk samples show that the compositions of the two bulk samples are different. The melting and crystallization of the fractions generally increased in both rubber and matrix as the fractionation temperature increases. The thermal properties were also different. The FTIR results further indicate that Sample 1 has higher levels of ethylene content compared to Sample 2 and the ethylene content in Sample 2 is generally more narrowly distributed throughout the sample when compared to Sample 1.