



**A CHALLENGE TO RHEOLOGICAL CHARACTERIZATION OF PP/EPR IN-REACTOR ALLOYS
SYNTHESIZED BY SPLIT-FEED COPOLYMERIZATION PROCESS**

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The rheological behaviour and morphology of in-reactor alloy of Polypropylene (PP)/Ethylene Propylene Rubber (EPR) synthesized by splitting the monomer feeding to copolymerization reactor are studied in this article. The Scanning Electron Microscopy (SEM) and oscillation rheometry were used to determine relationship between polymerization parameters, morphology and rheology, which can be used as a useful method to tailoring the blend structure. The electron microscopy of samples revealed that by increasing switching frequency in copolymerization time, the size of EPR dispersed phase decreased and the interconnection between the matrix and rubber domain is improved. The small amplitude oscillation rheometry showed that by increasing the switching frequency the viscosity curves shifted to higher values at low range of shear rates with no significant change at higher frequencies in Power-law region. The investigation on complex viscosity behavior at various temperature showed that the phase separation occur around 230 °C. The modified Cole-Cole plots showed that the elasticity of melt increased by increasing switching frequency before 230 °C and the trend reversed at higher temperature. The plot of phase angle versus absolute value of complex modulus is used for the evaluation of the validity of Time Temperature Superposition (TTS) principal. It is found that up to 210°C all samples showed nearly temperature independent curves while TTS principle failed at higher temperature.