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REACTIVE BLENDING OF PP WITH DYNAMICALLY CROSSLINKED POLYOLEFINE ELASTOMER (POE) BASED ON PE-LLD

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The objective of this work is to study the process of reactive blending of PP with dynamically crosslinked polyolefin elastomers (POE) in a co-rotating twin screw extruder. An important aspect of this process is to produce the blend of PP/POE with enhanced mechanical and impact properties at lower temperature and form stability at higher temperature as well. POE, in this case, is a PE-LLD based alpha-olefin copolymer which is subjected to crosslink by means of organic peroxides in a twin screw extruder. Simultaneously, PP is blended with POE. The cross linking of POE should enhance the mechanical properties. The parallel reaction which is unavoidable during this process is the degradation of PP caused by peroxide, which can lead to lower mechanical strength of blend. This should be minimized using suitable process design. All the sub-processes in the total blending process are studied separately in a series of preliminary experiments in a batch mixer to understand the cross linking of POE and the degradation of PP. The influencing factors considered hereby are peroxide concentration, reaction temperature, reaction time and the type of POE and PP. In further step PP has been mixed with POE and peroxide and processed in a twin screw extruder at different temperatures and for different processing conditions such as screw configuration, screw speed and through put. The samples are characterized with DSC, GPC, DMTA for the crystallinity, molecular weight and glass temperature respectively. Blend morphology has been analyzed by means of REM. Degree of cross linking of POE has been determined by extracting the sample of blend in xylol and the gel-content of the sample is determined.