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Morphology and Properties of Reactively Modified Heterophasic Polypropylene

<u>T. Pham</u> and M. Gahleitner Borealis GmbH, St.-Peter-Str. 25, A-4021 Linz, Austria

Polypropylene is one of the fastest growing commodity resins in the polymer world market. Compared to other thermoplastics, polypropylene shows very well balanced property combination such as low density, high melting point, high stiffness and low cost. Heterophasic polypropylene (impact polypropylene) is widely used in applications where high impact resistance is required such as automobile parts, household articles etc. In the past, the most common method for generating such multiphase polypropylene systems is melt mixing of homopolypropylene and an external rubber component. Nowadays, using modern polymerisation technologies, impact polypropylene with variable property combinations could be produced via multistage reactor arrangements. The adjustment of the final properties of heterophasic polypropylene (flowability, stiffness, toughness, etc.) could be controlled by the polymer composition, polymerisation parameters as well as by the post reactor modification step. In this paper, the effects of reactive post modification on the formation of ethylene-propylene copolymer grafted to polypropylene - which is believed to be the main reason for the strengthened interface between the PP matrix and EPR particles -, the phase morphology and final material properties have been investigated using a model system and demonstrated in a specific example on high flow materials for thin wall injection moulding. Depending on practical application requirements, well defined material performance such as toughness, flowability etc. could be adjusted.