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UPCYCLING OPAQUE PET BY REACTIVE PROCESSING: PHYSICAL MICROFOAMING DURING INJECTION MOULDING.

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ABSTRACT

The effect of structural and rheological modification by means of reactive extrusion of opaque recycled PET (Rex-rPET-O) on the physical foamability and mechanical performance of in situ sandwich composite (foamed core-bulk skin) prepared by the injection moulding technique named Mucell® has been evaluated. 100 x 100 mm square plates with two different nominal thickness (3 and 5 mm) with different levels of final weight reduction of the sandwich structure were prepared. Differential scanning calorimetry (DSC), Small amplitude oscillation shearing rheometry (SAOS), and bending tests were used to assess the effect of this modification. Scanning electron microscopy (SEM) observations and image processing were also used to study the morphology obtained in the prepared samples. The results revealed that, independently of the thickness and weight reduction, lower polydispersity in cell sizes and skin/core ratio were achieved for the foamed specimens with Rex-rPET-O. Further, the best mechanical performance, in terms of specific bending modulus and bending strength were higher for the modified than the unmodified rPET-O. Increasing the thickness of the plate, the specific bending stiffness seems to be improved when Rex-rPET-O is used.