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Slip Flow and Lubricated Extrusion of Thermoplastic Vulcanizate Blends

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The melt flow of three different soft thermoplastic vulcanizate blends of polypropylene with oil extended EPDM rubber crosslinked to different extents with varying amounts of phenolic curative has been investigated at 200°C for slip with the help of several dies mounted in a capillary rheometer. The morphology of these blends was analyzed with AFM images and the volumetric swell ratio of the rubber particles was found to decrease from 2.14 in the least crosslinked rubber to 1.9 in the most crosslinked rubber. The slip velocity in the flow of these blends was determined from a Mooney analysis and found to be noticeable at low shear stresses in two of the blends with more crosslinked particles. These observations and the associated lubrication film thicknesses have been compared with those reported for hydrogel suspensions with much greater volumetric swell ratios in the work of Meeker et al. (2004).