International Journal of Polymer Science, vol.2015, 2015

Numerical simulation analysis of unfilled and filled reinforced polypropylene on thin-walled parts formed using the injection-moulding process

Abstract

Thin-walled moulding technology has attracted increasing attention, particularly in electronic packing applications. The injection moulding of shallow, thin-walled parts with a thickness of 0.7 mm was performed using three types of materials from polypropylene, PP (PP, PP + 50 wt% wood composite, and PP + 10 wt% glass fibre composite). The highest deflection resulting from PP + 50 wt% wood does not occur in the critical area of the thin-walled part compared with PP + 10 wt% glass fibre. In addition, the results revealed that the warpage at the midpoint of the part surface injected using PP + 50 wt% wood is 0.04 mm lower than the value of 0.08 mm obtained when injected using PP + 10 wt% glass fibre. The warpage was hypothesised to result from the residual stress caused by nonuniform volumetric shrinkages formed during the solidification phase.

Keywords; Numerical simulation; Thin-walled parts; Injection-moulding process; Moulding; Polypropylene