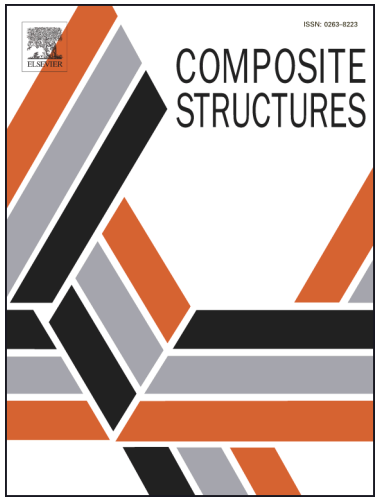

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Exploring damage kinetics in short glass fibre reinforced thermoplastics

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Abstract

In situ SEM tensile tests are performed to shed more light on the onset and damage evolution in the shell layer of a short glass fibre reinforced polyamide 6.6 (SGFRP) composite obtained by injection moulding. Damage mechanisms are studied in three different loading directions including 0°, 45° and 90° with respect to the mould flow direction (MFD). The development of damage is monitored until total failure at different scales of observation. Qualitative results indicate that the orientation of tensile specimens with respect to the mould direction determines to a large extent the nature of involved damage mechanisms. Interfacial damage is by far the leading damage mechanism. Quantitative investigation further indicates multi-stage damage kinetics, which demonstrates an asymmetric behaviour with respect to sample orientation. One to two main