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Abstract

Mechanical, morphological and thermal properties of optical fiber adhesives, based on poly(ethylene-*co*-vinyl acetate) (EVA) with 18 and 40% of vinyl acetate, polymer blend of EVA/poly(methyl methacrylate) (PMMA), and graft polymer, raw EVA-*g*-PMMA, prepared *via in situ* free radical polymerization, were studied. Extraction of PMMA homopolymer from raw EVA-*g*-PMMA produced purified EVA-*g*-PMMA, which enable quantitative determination of graft initiating centers by NMR spectroscopy. FTIR and image analysis allowed determination of the graft content/level in purified EVA-*g*-PMMA. Grafting effect to compatibilization efficiency in EVA-*g*-PMMA was monitored by image analysis of gelation processes and determination of wetting angle. Single lap joint of adhesives/optical fibers were subjected to adhesive testing before and after aging on 60 °C for 60 h and 120 h. Thermogravimetry coupled with mass spectrometry showed different thermal stability and degradation pathways of adhesives, and reduced the degree of deacetylation of thermally treated EVA-*g*-PMMA adhesive. DSC analysis showed higher thermal stability of EVA-*g*-PMMA adhesive. Better mechanical properties of EVA-*g*-PMMA, *i.e.* 62.4% higher Charpy impact strength value in relation to EVA, was obtained.

Keywords: adhesion; optical fibers; compatibilization; thermal aging; polymer blends.